



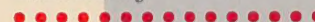
Hands-on, self-paced
measurement
training guide



Understand your
network more
completely



Manage your
network more
efficiently



Troubleshoot
more effectively



HP Internet Advisor for Token Ring Training Manual

Note to Users

Hewlett-Packard offers several training choices to the Internet Advisor user ranging from this training manual to structured on-site user certification classes that are offered for each network technology (Ethernet, Token Ring, FDDI, WAN E1 or T1).

The first choice is to get started on the Internet Advisor using this self-paced training manual. This comprehensive collection of exercises will allow new users of the Internet Advisor to learn the product while refining their troubleshooting skills on prepared data files. This manual and the data files that are part of the A.08 LAN software version contain material that has evolved over the last few years from our extensive experience providing user certification classes.

The second option, User Certification classes, is for those who prefer more interactive learning. These classes are led by an HP technical consultant having a background in network technology and troubleshooting. One-day classes are conducted at one of the HP regional training centers or sales offices. To find out more, contact your HP Sales Representative about enrolling in one of the Internet Advisor User Certification classes.

The third choice is to arrange a special, on-site user certification class. Course material can be adapted to take advantage of the opportunity to perform lab exercises on the customer's own local area network.

User certification classes are scheduled by the HP Test and Measurement Education Center, where HP Internet Advisors are set-up in a classroom environment. The class can accommodate up to ten people. Your HP Sales Representative can contact the HP Education Center and arrange for a user certification class to be presented in any city where there is a sufficient number of customer requests. To order, call 1-800-HP-CLASS (1-800-472-5277) in the USA. Outside the USA, contact your local HP sales representative.

In addition, technical support for the Internet Advisor is always available from our Customer Helpline over the telephone (call-back system) or via the Internet.

Customer Helpline: 719-531-4567 in Colorado Springs, Colorado, USA

Internet Address: CCO_HELPLINE@HP-COLSPRINGS-OM1.OM.HP.COM

Plus, please visit our WWW site at: <http://www.tmo.hp.com/tmo/ntd> and then press **Portable Protocol Analyzers**.

Introduction

This training manual is designed to give you a working knowledge of the measurements that can be performed with the HP Internet Advisor for LAN, as well as to provide you with practical applications for using each measurement. Each chapter provides step-by-step instructions on how to configure and run these measurements. The illustrations used are identical to what you will see on your Internet Advisor's screen.

Most measurements described in this manual use data that has been previously captured. However, some measurements will require access to a live network. At the start of each chapter, a section on preparation for the measurement is presented. As you begin a chapter, note whether an Advisor Data File (previously captured data) or a live network, as well as a Station List, is to be used. Loading an Advisor Data File and Station List are detailed in chapter 2.

To fully understand the measurements and capabilities of the Internet Advisor, proceed through each chapter in sequence, and complete all exercises before continuing to the next chapter. This manual is intended to be self-paced. You will gain considerable benefit by performing each measurement that is described. After completing all chapters, use this manual as reference material.

Contents

Chapter 1 -- Setting up the HP Internet Advisor for Token-Ring

Chapter 2 -- Station List and Station Discovery

Chapter 3 -- Filters

Chapter 4 -- Expert Advisor

Chapter 5 -- Statistics

Chapter 6 -- Vital Signs

Chapter 7 -- Commentators

Chapter 8 -- Traffic Generator

Chapter 9 -- Stimulus Response Tests

Manual Conventions

As network measurements are described in each chapter, you are prompted to configure and run the measurement. Text that is **bold** and contained in [] depicts commands that you should enter on the Internet Advisor. The | between commands is for readability only; it should not be entered. For example, if you see [F4 | Z], you should press the F4 function key and then the Z key.

Chapter 1 - Setting Up the HP Internet Advisor for Token-Ring

Objective

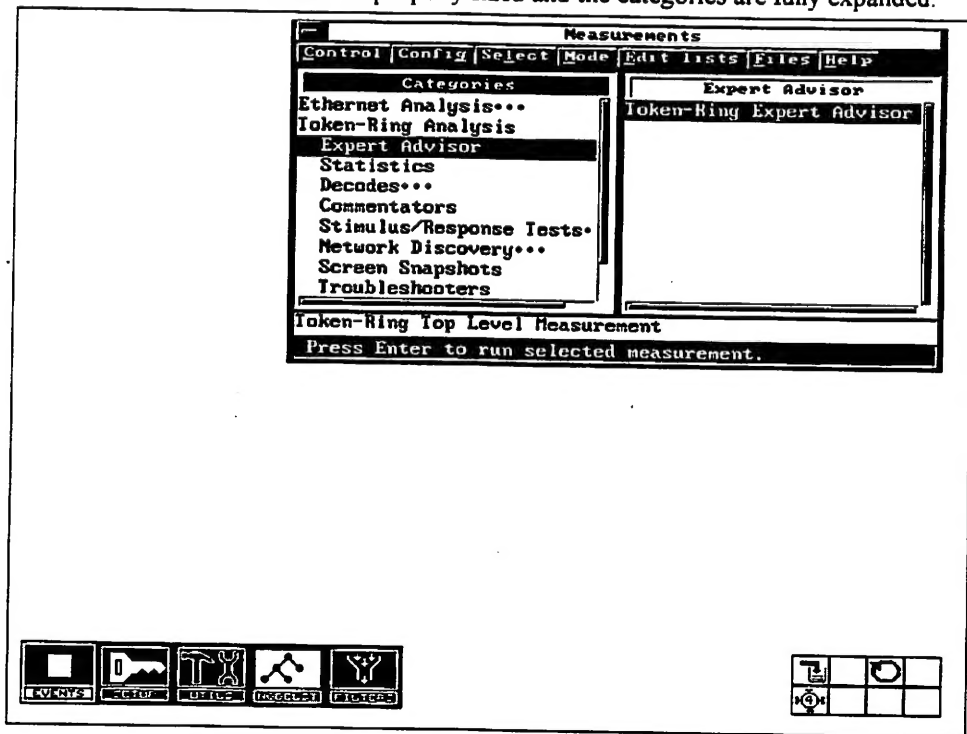
This chapter explains how to configure your HP Internet Advisor for Token-Ring and how to navigate quickly through the instrument's powerful measurement set.

Topics Covered

- Setup window and Status Icons
- Additional utilities and configurations
- Controlling the various windows throughout the analyzer
- Event Log and All Events Browser

Preparation

- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.

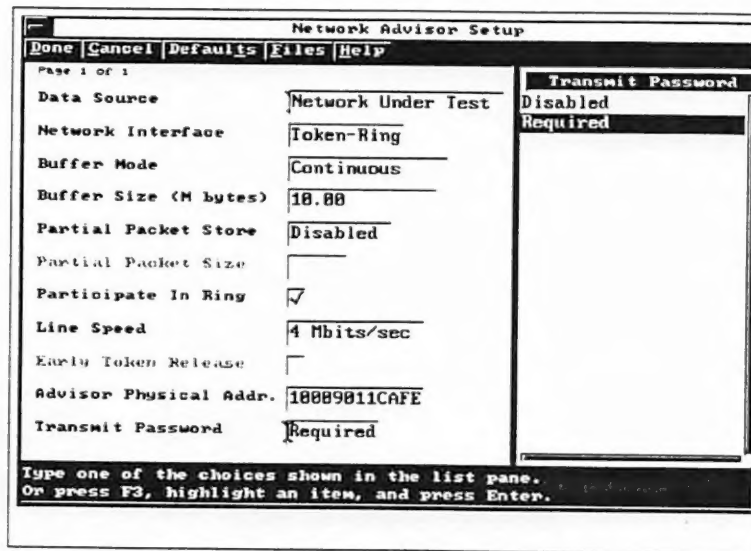


Properly sized Measurements window

Viewing the Setup Window

The Setup window lets you identify the type of network you want to test and how you want the Internet Advisor for Token-Ring to operate.

1. Open the Setup window by pressing [F9] Setup key or double clicking on the **SETUP** icon.
2. Restore default setup values by selecting from the menu bar [**Defaults** | **Restore default values**].



Network Advisor Setup	
Done | Cancel | Defaults | Files | Help	
Page 1 of 1	
Data Source	Network Under Test
Network Interface	Token-Ring
Buffer Mode	Continuous
Buffer Size (M bytes)	18.88
Partial Packet Store	Disabled
Partial Packet Size	
Participate In Ring	<input checked="" type="checkbox"/>
Line Speed	4 Mbits/sec
Early Token Release	
Advisor Physical Addr.	18009011CAFE
Transmit Password	Required
Transmit Password Disabled Required	
Type one of the choices shown in the list pane. Or press F3, highlight an item, and press Enter.	

Setup window

When you open the Setup window, the field values are determined by the system setup file. The Setup window includes:

- Data Source
- Network Interface
- Buffer Mode
- Buffer Size
- Partial Packet Store
- Partial Packet Size
- Participate In Ring
- Line Speed
- Early Token Release
- Advisor Physical Address
- Transmit Password

To Change a Field Value, Use One of These Methods

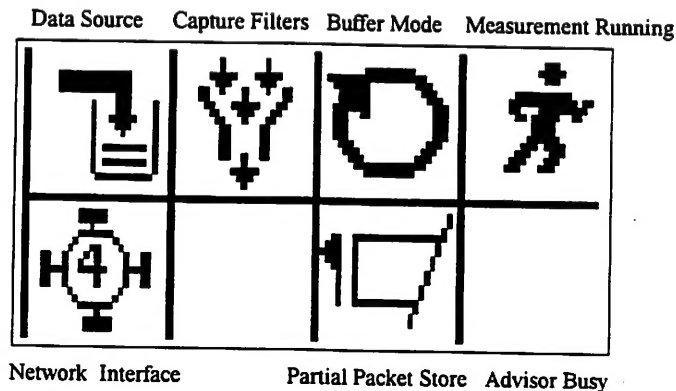
1. Position the cursor in a field, select a configuration option from the pane on the right side of the window, and save the values to the system file using the **[Done | Accept changes and exit]** menu bar item.
2. Or, you can load values from a user file, using the **[Files | Load setup/filters from user config file]** menu bar option.

You can undo any changes you make, or return the field entries to default values.

- The **Menu Bar**, shown at the top of the Setup window, includes the following items to control activities for the window.

Item	Activity
Done	Lets you save the changes, or save changes and reduce the window to an icon.
Cancel	Lets you cancel any changes you made to the Setup parameters.
Defaults	Lets you restore the original parameter values supplied when the Internet Advisor for Token-Ring was shipped.
Files	These options let you save current Setup field values to a user configuration file or the system configuration file, load Setup field values and filters from an existing user or system configuration file, and save the Capture Buffer to an Advisor Data File. When you save and exit the Setup window, the system configuration file is updated. The next time the Internet Advisor is started, the system configuration file is read and its field values are used as default values.
Help	Lets you access information about the Setup window topics.

There are eight graphic icons in the lower right corner of the Internet Advisor screen. These icons show the current status of the instrument. They can be toggled to change the state of the Internet Advisor. Most of these icons correspond to fields in the Setup window as noted below.



- The **Data Source** field in the Setup window designates the type of data on which the Internet Advisor will perform measurements. This data can come from the Advisor Data File, the Capture Buffer, or the Network Under Test. This field is disabled when any measurement is running and the Data Source field is Network Under Test.

Item	Activity
Advisor Data File	If you select Advisor Data File in the Data Source field, you can test a previously saved data file in post-processing mode. An Advisor Data File is created when you capture data from the network under test and save it, using the Save Capture Buffer to Advisor Data File in the Setup window Files menu bar option.
Capture Buffer	During a measurement, when Network Under Test is selected in the Data Source field, data from the network under test is stored in the Capture Buffer. If you then select Capture Buffer as the data source, you can re-examine the data you just captured from the network.
Network Under Test	Select this when you want to run a measurement on traffic currently occurring on the LAN to which you are connected.

- **Status Icons**—Of the eight graphic icons in the lower right corner of the screen, the Data Source icon is first from the left in the top row. When Network Under Test is selected in the Data Source field, this icon resembles a buffer filling up with data. When Capture Buffer or Advisor Data File is selected, the icon resembles a buffer being emptied.
- The **Network Interface** field in the Setup window lets you choose the type of network to test, and your choice affects the measurements you can select to run in the Measurements window. If your Internet Advisor has Ethernet and Token-Ring interface modules, select the appropriate interface to connect to your network under test.
 - **Status Icons**—Of the eight graphic icons in the lower right corner of the screen, the Network Interface icon is first from the left in the bottom row. When Token-Ring is selected, the icon resembles stations connected in a ring, and shows a value of 4 or 16 to indicate the line speed in Mbits per second.
- The **Line Speed** field in the Setup window is displayed when the Token-Ring network interface module is loaded. The Internet Advisor for Token-Ring can operate on Token-Ring networks running at either 4 Mbits or 16 Mbits data rates.
 - **Status Icons**—Of the eight graphic icons in the lower right corner of the screen, the first location from the left in the bottom row indicates the Line Speed status. When the Network Interface field is set to Token-Ring, and the Data Source field is Network Under Test, the Token-Ring status icon displays 4 or 16 Mbits speed.

- The **Participate In Ring** field in the Setup window is displayed when the Token-Ring network interface module is loaded. Whenever you run a measurement, the Internet Advisor is inserted onto the Token-Ring network. You can choose not to participate in the Token-Ring protocol by toggling the check mark to OFF. In non-participate mode, the Internet Advisor passively monitors the network and lets you attach to the ring even during a beaconing state.
 - **Status Icons**—Of the eight graphic icons in the lower right corner of the screen, the first location in the bottom row indicates the Participate In Ring status. When in non-participate mode, the Network Interface icon has a red 'X' through it.
- The **Early Token Release** field in the Setup window is displayed when the Token-Ring network interface module is loaded. When this field is selected, the Internet Advisor will release the token immediately after it transmits the last bit of the frame it is transmitting. You can select the Early Token Release for networks that are operating at 16 Mbits/sec line speed.
- The **Buffer Mode** field in the Setup window allows you to save packets in the capture buffer continuously or until the buffer is full.

Item	Activity
Continuous	If you select this before running a measurement, the Internet Advisor initializes the capture buffer, captures data until the buffer is full, then continues to capture data by writing new data over the oldest data in the buffer until you stop the measurement.
Stop When Full	If you select this before running a measurement, the Internet Advisor initializes the capture buffer, captures data until the buffer is full, and then stops the measurement.

- **Status Icons**—Of the eight graphic icons in the lower right corner of the screen, the Buffer Mode icon is third from the left in the top row. When the Continuous capture mode is selected, the icon looks like a circular buffer. When the Stop When Full capture mode is selected, the icon looks like a linear buffer filling up.
- The **Buffer Size** field in the Setup window lets you specify how much RAM within the analyzer you want to use for the capture buffer. When you select the Buffer Size field, you can choose the maximum or minimum size, or choose one of the specific memory sizes shown. RAM used for the buffer is separate from the 16Mbyte RAM in the 486 PC.

- The **Partial Packet Store** field in the Setup window can be enabled or disabled.

Item	Activity
Enabled	When Partial Packet Store is enabled, the Partial Packet Size field lets you specify the number of bytes in each packet to save. The Internet Advisor will capture only the first portion of each packet. By storing only partial packets in the capture buffer, you can store more packets for a given buffer size. When the Advisor's filters or packet slicing functions are used, certain measurements may not be able to observe the nearest available upstream neighbor (NAUN), active monitor present (AMP), and standby monitor present (SMP) frames. If this occurs, stations that are connected to the network may not be listed in some measurements.
Disabled	When Partial Packet Store is disabled, the Internet Advisor only stores complete packets in the capture buffer. When this field is disabled, you cannot change the Partial Packet Size field value.

- **Status Icons**—Of the eight graphic icons in the lower right corner of the screen, the Partial Packet store status icon is third from the left in the bottom row. When the Data Source field is set to Network Under Test, and Partial Packet Store is enabled, the icon resembles a start flag followed by a frame of data being truncated.

- The **Partial Packet Size** field in the Setup window lets you specify how many of the beginning bytes of each packet you want to save in the capture buffer. This field is available for selecting choices when the Partial Packet Store field is enabled.

Item	Activity
Bytes to capture	On Token-Ring networks, you can capture up to 18,000 bytes of each packet. The Internet Advisor for Token-Ring uses 32-bit (long) words for the received data. For this reason, the Partial Packet Size value is rounded up so that it is divisible by four. For example, if you enter 41 in the partial Packet Size field and press Enter, the value is actually set to 44. Default is 100 bytes. You should not set it lower, or you may slice protocol specific information from the frame, which would adversely affect some measurements.

- The **Advisor Physical Address** field in the Setup window always displays the address of the physical layer interface that is currently selected in the Network Interface field. A Token-Ring address is displayed when the Network Interface field is set to Token-Ring. You can change the physical address field value by typing a value that is not shown in the Physical Address pane. Then when a measurement requires the Internet Advisor to send a source address, it sends that address as the Source Address field contents of a packet. To return the address to the Internet Advisor actual physical address, select that address from the pane. This field is grayed out when any measurement is running and the Data Source field is Network Under Test, or when the Data Source is set to Capture Buffer.

- The **Transmit Password** field in the Setup window lets you control the Internet Advisor's ability to run Stimulus/Response Test measurements that transmit on the network. These measurements are listed in the Stimulus/Response Tests Categories in the Measurements window. When you enter the password, all transmit measurements run without requiring the password until the Transmit Password field is reset to Required. The password, "*advisor*" is set at the factory. The Transmit Password state and value are saved to a special location that is read when the instruments boots. If you load a user file that has a different Setup configuration, it will not affect the Transmit Password state and value. Specific states of the Transmit Password field are described below.

Item	Activity
Required	When the Transmit Password is Required, you must enter the password before running a measurement that transmits on the network, such as Traffic Generator.
Disabled	When changing the Transmit Password state to Disabled, you must enter the password. When the Transmit Password state is Disabled, a password is not required to run a measurement that transmits on the network. When changing the Transmit Password state to Required, you can enter any password.
Entered	This state is displayed when you have entered the correct password. When the password has been entered, any transmitting measurement runs without requesting the password again.

- **Changing the Password**—You can change the password by selecting Disabled from the Transmit Password list pane and entering the current password. Then select Required from the list pane and enter the new password. You must enter the password a second time for verification.

Operational Modes for the Internet Advisor for Token-Ring

Topic	Activity
Participate and Non-Participate	The Internet Advisor must be inserted onto the Token-Ring network before it can participate in the ring. Whenever you run a measurement, the Internet Advisor is inserted onto the Token-Ring network. When you choose not to participate in the Token-Ring protocol, the Internet Advisor passively monitors the network and lets you attach to the ring even during a beaconing state. If a ring is in a beaconing state, Non-Participate is used at the proper ring speed.
Early Token Release (16 MB only)	This lets the Internet Advisor release the token immediately after it transmits the last bit of a frame it is transmitting. You can select early token release only for networks operating with 16 Mbits/sec line speed.

Viewing the Function Keys

The function keys (F1-F12) and their actions include:

Key	Activity
F1 Help	Displays information about the currently active window.
F2 Next Window	Selects another window or system window icon displayed on screen.
F3 Next Pane	Selects the next portion of the currently active window.
F4 Window Menu	Selects the activities you can perform on the currently active window. These include zoom, unzoom, icon, move, size, and close.
F5 Close	Closes a currently active window that was activated from a main window. You can close only these types of windows; main windows can only be reduced to icons.
F6	Not Used.
F7 Event Log	Displays the Event Log window. You can then choose to view the protocol, threshold, topology, fault, or instrument events, or you can browse all events.
F8 Meas	Displays the Measurements window which shows the measurement categories and statistics.
F9 Setup	Displays the Setup window, which lets you select the data source, network interface, buffer mode and size, packet store, media connection, and password requirements.
F10 Utils	Displays the Utilities window, which lets you access the File Manager, PC hardware configuration, autostart configuration, view version information, and exit to DOS.
F11 Node List	Displays the Node/Station List window, which shows all stations, and the information and address for the selected station.
F12 Filters	Displays the Capture Filters window, which shows the active filters, and allows you to activate and deactivate filters.

You can also use the **Esc** key to toggle between the menu bar and the last window option selected. When using the mouse, you can use the left and right buttons to make selections.

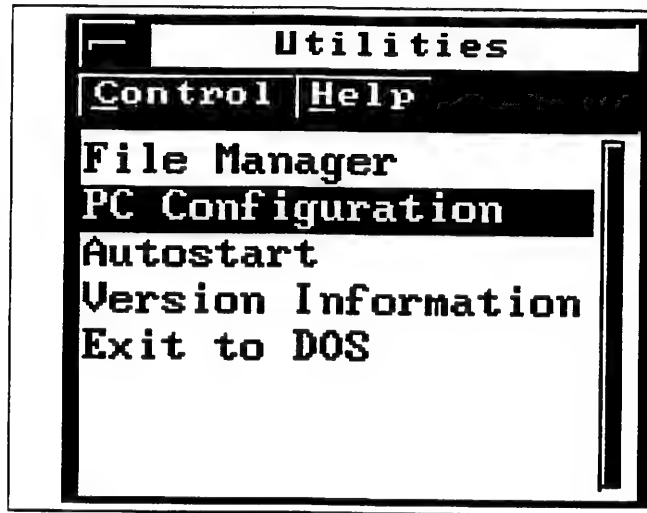
3. Press **[F4 | I]** to iconize the Setup window.

Viewing the Utilities Window

The Utilities window lets you run the following utilities.

- File Manager
- PC Configuration
- Autostart
- Version Information
- Exit to DOS

Press [F10] or double click on the UTILS icon to open the Utilities window.



Utilities window

A summary of each utility follows:

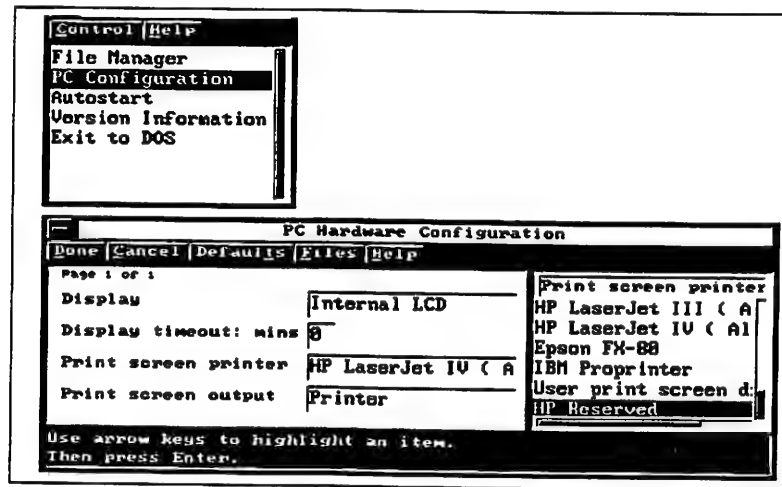
- **File Manager** lets you view the subdirectories and file listings on the hard disk. You can copy, delete, rename, and print files, and create and delete subdirectories. Various data files are included in the \user\datafile subdirectory. Station list storage locations are included in the \user\nodelist subdirectory. The \user\stats directory contains .csv files. Other subdirectories in \user are also included for autostart, vitals, filters, configuration, setup, and user interface shell files.

- **PC Configuration** shows PC hardware configuration, including type of display, display timeout, type of print screen printer, and whether the print screen output is set to printer, file, or disabled.
- **Autostart** lets you automatically configure or initialize the state of the Internet Advisor, including the PC Configuration, Setup, and Node/Station List windows from either system or user files. You can also automatically run measurements that you select in the Autostart Measurements window; do this after both Enable Configuration and Enable Measurements are selected in the Autostart Configuration window, and after you select and open the Autostart Measurements subwindow.
- **Version Information** lets you view information about the system hardware, firmware, and software version numbers. System version A.08 became available in December, 1995.
- **Exit to DOS** stops all currently running measurements, and lets you exit to either DOS or the Internet Advisor Toolkit. Any measurement data that is not saved will be lost. To restart the Internet Advisor for Token-Ring after finishing work at the DOS level, type "*advisor*" at the DOS prompt, or select Token-Ring Advisor from the Toolkit.

Note: For more detailed information on the function of any window, use the Help menu to view Help Topics Index for that window. Press [F1] for a list of Help Measurement Topics, or from any window, select [Help] from the menu bar.

Configure to Print to Printer or File

1. Press [F10] or double click on the UTILS icon to select the Utilities window.
2. Select [PC Configuration].
3. Use either the down arrow key or the mouse to highlight the Print screen printer field. Tab to the right and select the appropriate printer, or select HP Reserved to print data to an ASCII file.
4. Use the down arrow key, or use the mouse, to highlight the Print screen output field. Tab to the right and select Printer, if you have a printer attached, or File if you want data from measurements copied to an ASCII file.



PC Hardware Configuration window

5. When finished, select [Done | Accept changes and exit]. Press [F4 | I] to iconize the Utilities window.

Note: If you do not have a printer directly attached to your Internet Advisor then configure the Advisor to print to a file. From any measurement that has the Print menu-bar selection, when you select "print", the File Manager application will run and allow you to copy the contents of the measurement to the Internet Advisor's hard drive or floppy drive as an ASCII file.

Using Window Controls

To Activate the Window Menu to Control the Attributes of the Active Window

1. Press [F9] to open the Setup window. Press [F4]. Then you can:

Select	Then
Zoom	Press Enter to enlarge the window to the maximum screen size.
Unzoom	Press Enter to reduce a zoomed window to its previous size.
Icon	Press Enter to reduce a window to an icon at the bottom of the screen. You can reduce both windows and subwindows to icons. A running measurement that has been iconized continues to run.
Move	Press Enter to move the window. When you have positioned the window where you want it, press Enter again or click the mouse. Or, you can click on the window's title bar and drag the window on the screen.
Size	Press Enter to begin adjusting the size of the window. Use the arrow keys or the mouse to set the window to the size you want. Then press Enter or click the mouse.
Close	Press Enter to close a subwindow. Or, you can use F5 to close a subwindow. Remember, you can only reduce system windows to icons—you cannot close them.

The system windows include Measurements, Utilities, Setup, Event Log, Node/Station List, and Filters.

You can “iconize” system windows. When a system window is iconized, the window reduces to an icon at the bottom of the screen. You cannot use the “Close” menu item to close system windows.

Using Quick Keystrokes

When controlling the attributes of a window, after pressing [F4], you can use these shortcuts:

- Press “i” to iconize a window.
- Press “z” to zoom a window.
- Press “m” to move a window.
- Press “s” to size a window.

Internet Advisor Keyboard Shortcuts

Internet Advisor Keyboard Shortcuts		
Function Key	Label	Notes
F1	Help	
F2	Next Window	
Shift F2	Previous Window	
F3	Next Pane	
Shift F3	Previous Pane	
F4	Window Menu	
F5	Close Window	Can also close an iconized window.
F6	Not Used.	
F7	Event Log	
F8	Measurements	
F9	Setup	
F10	Utilities	
F11	Node/Station List	
F12	Filters	
Esc	Menu Bar	A side effect of pulling down the menu bar is that the display pauses.
Tab	Next Pane	
Shift Tab	Previous Pane	

Keyboard Accelerators For an Active Measurement Window's Menu Bar

Keys	Operation	Notes
Esc R	Run Measurement	
Esc S	Stop Measurement	
Esc B	Switch to Capture Buffer	This will also stop all running measurements.
Esc O	Run open measurements from network	This will run all measurements that have been opened, including any iconized windows.
Esc G	Configuration Menu	
Esc M	Format Menu	
Esc T	Print Menu	
Esc H	Help Window	

Keyboard Accelerators for the Window in Focus.

Keys	Operation	Notes
F4 Z	Zoom or Unzoom the window	
F4 I	Iconize the window	Running measurements continue to run.
F4 M	Move the window	You can also do this to move a window: 1. Click in the window and the title bar will turn yellow. 2. Click and hold on the yellow title bar. 3. Drag the window to the desired location.
F4 S	Size the window	
F4 C	Close the window	Stop the measurement and close the window.

Status Icon Manager

Data Source	Capture Filters	Buffer Mode	Measurements Running
Capture Buffer or Network Under Test	Activate Capture Filter or Deactivate Capture Filter	Continuous or Stop when Buffer is Full	None—white running man Monitor—black running man Transmit—red running man
Network Interface		Partial Packet Store	Advisor Busy
4 or 16 Mbps; participate or non-participate		Activate Partial Packet Store or Deactivate Partial Packet Store	Hour glass indicates Internet Advisor for Token-Ring is busy computing. Note: No action is taken when this icon is selected.

Moving Around in the Capture Buffer	
Key	Function
Home	Go to first frame in buffer.
Shift Home	Go to start of current frame when in detailed decode. Note: On a PC, use up arrow on number pad.
End	Go to last frame in buffer.
Shift End	Go to end of current frame when in detailed decode. Note: On a PC, use up arrow on number pad.
Down Arrow	Go to next frame in buffer.
Up Arrow	Go to previous frame in buffer.
Right Arrow	Scroll current frame right.
Left Arrow	Scroll current frame left.
Page Up	Scroll current frame up to higher level protocols in frame (detailed decode only).
Page Down	Scroll current frame down to lower level protocols in frame (detailed decode only).
Shift Up Arrow	Scroll up (roll up) one line in current frame to higher level protocols in frame. Note: On a PC, use up arrow on number pad.
Shift Down Arrow	Scroll down (roll down) one line in current frame to lower level protocols in frame. Note: On a PC, use up arrow on number pad.
Enter	Synchronizes decode windows. When running from capture buffer with multiple decode windows open, press Enter to synchronize the decode windows (align all decodes onto the same frame).

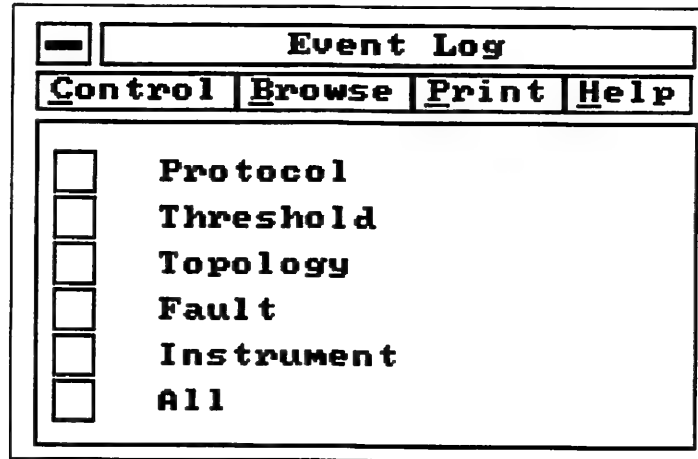
Terminating Long Operations	
Key Sequence	Operation
Ctrl Break	Stops decode windows that appear hung with an hour glass. The decode is searching for frames that match the protocol decode window.
	Stops capture buffer upload and download (to and from a file).
	Stops decode searching actions.
	Stops printing to printer.
	Stops printing to file.
Alt Ctrl Del	Reboots the Internet Advisor for Token-Ring (this is the same as powerup).

Map of the Internet Advisor for Token-Ring		
Operation	What's Inside	Function
Measurements	Network Analysis Measurements	Organize all tools (Statistics, Decodes, Commentators, Stimulus/Response, Network Discovery, Expert Troubleshooters and Snapshots) for analysis of the specified network.
	Expert Advisor	Monitors network and displays network health and other statistics by protocol stack.
	Statistics	Present a variety of statistical network information.
	Decodes	Display the contents of the packets on the network.
	Commentators	Summarizes network events at the protocol layer.
	Stimulus/Response Tests	Generate traffic, interact with network devices, and characterize network performance.
	Network Discovery	Display network configuration, generate baselines, and automatically build a node list including user-given node names.
	Screen Snapshots	Customize your measurements and screen to create a snapshot.
	Expert Troubleshooters	Integrated measurements to troubleshoot protocol environments.
Setup	Data Source	Select Network, Capture Buffer, or File as the Data Source.
	Network Interface	Select the type of network to test: Ethernet or Token-Ring.
	Capture Buffer parameters	Select Buffer Mode, Buffer Size, and Partial Packet Store.
	Interface parameters	Select network-specific parameters for Ethernet or Token-Ring.
	Advisor Physical Address	Select the MAC address for the Internet Advisor for Token-Ring.
	Transmit Password	Password protection for measurements which transmit on the network.
Node/Station List		Create or modify the station list used by the Internet Advisor for Token-Ring.
Filters		Create hardware capture filters. These filters allow only specified frames into the Capture Buffer.
Events		Event logs that summarize network events in categories: Protocol, Threshold, Topology, Fault, Instrument, and All.
Utilities		Set up the printer, manage your disks and files, exit to DOS, and check software version number.

2. Press [F4 | I] to iconize the Setup window.

Viewing the Event Log

1. Press [F7] to open the Event Log. You can choose to view all events by selecting, from the menu bar [Browse | Browse All Events]. The All Events Browser window displays all events occurring on the network under test, along with the date and time the event occurred.



- The Event Log contains six event categories:
 - ▶ Protocol
 - ▶ Threshold
 - ▶ Topology
 - ▶ Fault
 - ▶ Instrument
 - ▶ All
 - Each event in the Event Log is categorized:
 - ▶ "N" indicates a Normal event.
 - ▶ "W" indicates a Warning event.
 - ▶ "A" indicates an Alert event.
2. You may print events in the Event Log. Select [Print] from any of the six event log categories. You can select to print in text format, or csv format, and choose whether to include normal, warning, and alert events. The Event Log can be printed to a printer or file.
3. Press [F5] to close the All Events Browser. Clear the Event Log by selecting [Control | Clear Event Log]. A warning appears to verify that you want to clear the log. Select [Yes] and press [Enter].
4. Press [F4 | I] to iconize the Event Log and press [F8] to open the Measurements window.

Chapter Notes

Chapter 2 - Station List and Station Discovery

Objective

Measurements in the Internet Advisor for Token-Ring use the Station List as the source for station names, so having an updated station list helps you in troubleshooting and managing your network. Station Discovery and Station List provide valuable tools to help you create one or more station lists. In this chapter, you will learn how to use both the Station Discovery application and the Station List to fully document the stations on your network.

Topics Covered

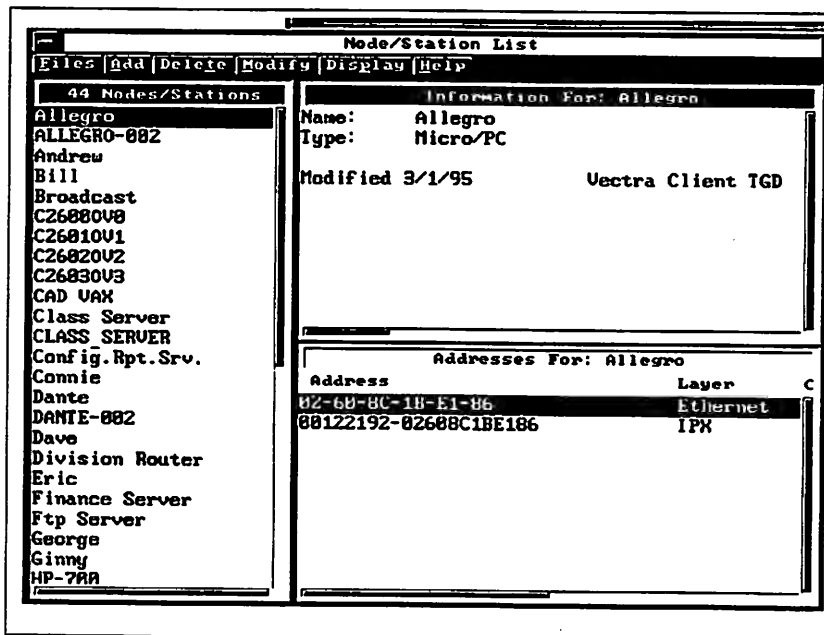
- File Manager application and its role in managing several different station lists
- An overview on editing station information and adding addresses to the station list
- A discussion of the preferred sequence of passively monitoring the Token-Ring network and using the Station Discovery measurement to build an accurate station list
- Creating a station list using buffer data and the replay capability
- In-depth analysis of how the Station Discovery measurement provides results
- Configuring Station Discovery
- Creating, saving, and printing a station list
- Names and addresses found by Station Discovery

Preparation

- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.
- Two Station Lists will be used: `c:\user\class\class.lst` and `c:\user\class\empty.lst`.
- The Advisor Data File `c:\user\class\discover.tr` should be loaded into the capture buffer.

View the Node/Station List Window

1. Open the Station List by pressing [F11].
2. From the menu bar, select [Files | Load Node/Station List | Replace Node/Station List]. File Manager opens, displaying station lists contained in the `c:\user\nodelist` directory. In the Directories pane, change the directory to `class`. Tab to the Files pane and select [class.lst], then from the menu bar, select [Done | Accept selection and exit]. A message appears stating that you will overwrite any existing station list. Select [yes] and press [Enter] to continue.



Node/Station List with class.lst loaded

The functions of the Node/Station List window panes include the following:

- **All Nodes/Stations**
This pane lists the names of stations in the current station list according to the current display options.
- **Information For:**
This pane shows information about the highlighted station in the station list, including the station name, station type, and any comments. This information could also include the user's phone number, location of the station, and user applications.
- **Addresses For:**
This pane shows address information for the highlighted station in the station list, including the address, protocol layer, address name, and cable ID.

Locate a Station in the Node/Station List

1. Select the [Nodes/Stations] pane. Type the letters "site" for Site Gateway. The Internet Advisor locates the next occurrence of these letters and displays information about that highlighted station.

Note: Key Word text string search is available in the Node/Station List pane and other lists contained in the Internet Advisor. Starting at the beginning of a list, you may type letters on the keyboard and the Internet Advisor will highlight the first available entry having matching letters. After finding the first occurrence of text, you can use the [CTRL] and [F] key simultaneously to search forward for the next match, or [CTRL] and [B] key simultaneously to search for the previous occurrence. You can find more information about searching in the System Help Topics under "searching".

Edit Information about the Station

1. Click twice on the [Information For:] pane, or tab to the [Information For:] pane and press [Enter]. The Node/Station Modification Window is displayed.
2. To edit the station name, click on the [Node/Station Name] field.
3. To change the station type, click twice on the [Node Type] field, or use the down arrow key to select the [Node Type] field.
4. The Comments window is used for entering location information, user phone number, etc.

When you are finished, select [Cancel | Cancel changes and exit].

Edit the Station Address

1. From the Node/Station List window, click twice on the [Addresses For:] field, or tab to the [Addresses For:] field and press [Enter]. The Address Editor window opens. You can change the protocol layer, address, cable ID, and address name.
2. When you are finished, select [Cancel | Cancel changes and exit].

Save and Load a Node/Station List

In the Node/Station List window, the Files menu allows you to save and load a Station List. You can define and save multiple station lists on the hard disk.

Save a Station List

1. In the Node/Station List window, select **[Files | Save Node/Station List]** from the menu bar. The Save Node/Station List window opens. The default directory is *c:\user\nodelist*.
2. Type the name of the new station list in the **[File name:]** field. Maintain the *.lst* extension. For this chapter, use the following file name: **[chap2.lst]**
3. From the menu bar, select **[Done | Accept selection and exit]**.

Load a New Station List

1. In the Node/Station List window, from the menu bar, select **[Files | Load Node/Station List | Replace Node/Station List]**.

If you elect to replace the station list, the existing list will be removed from the CURRENT.LST area but will still remain on the hard disk (if previously saved to a station list file). If you elect to merge the new station list, the Internet Advisor will combine that list with the currently loaded list.

2. From the File Manager window, select the **[c:\user\class\class.lst]** file. From the menu bar, select **[Done | Accept selection and exit]**.

When you load a new station list using the replace option, the following message is displayed: Continuing with this load operation will delete the current Node/Station list. Do you want to continue?

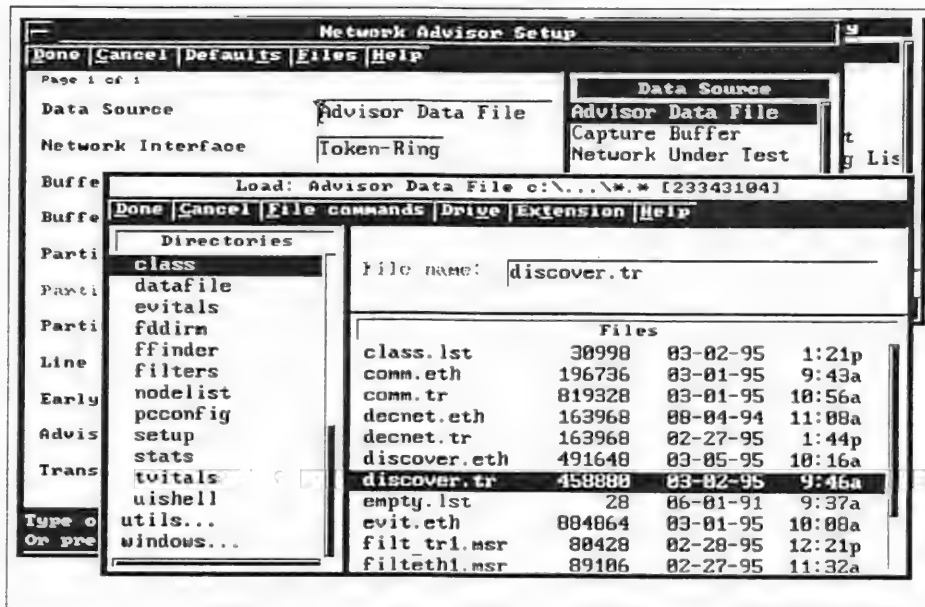
Decide whether to continue. Answer **[yes]** and press **[Enter]**.

When you merge a station list into the Internet Advisor, duplicate names and addresses are not detected. If you add new names and addresses to that station list, the instrument checks to see if they duplicate names and addresses.

3. Press **[F4 | I]** to iconize the Node/Station List window.

Loading an Advisor Data File into the Capture Buffer

1. Click twice on the **SETUP** icon, or press **[F9]** to bring up the Setup window.
2. From the Data Source pane, type **[a]** for Advisor Data File and press **[Enter]**. You may see a message dialog box appear which asks if you would like to continue and destroy the capture buffer data; select **[yes]** and press **[Enter]**. The File Manager Data File Load window opens.
3. Notice the data file extensions are: (.eth) for Ethernet, (.trn) for Token-Ring and (.fdi) for FDDI. The default directory is *c:\user\datafile*. In the Directories pane, change the directory to **[class]**. Tab to the Files pane and use the down arrow key to select the file labeled **[c:\user\class\discover.tr]** and select **[Done | Accept selection and exit]**. A dialog message box displays the frame numbers as they are downloaded into the capture buffer. Notice that the green status icon for the Data Source changes to Capture Buffer.



Loading an Advisor Data File

4. When the Advisor Data File has loaded, press **[F4 | I]** to iconize the Setup window.

Discover Additional Nodes

1. In the Station Discovery window, select **[Control | Run Measurement From Capture Buffer | All Frames]** from the menu bar. After three seconds, the station list changes in several ways. Many of the stations change from blue to green, indicating a known station that has transmitted frames on the network. The new stations observed are displayed in red. Scroll down using the vertical scroll bar, or Next Page/Prev Page keys to view new entries.

Station Discovery					
Control	Config	Display	Node/Station	List	Print Help
All Stations					
Station New address		Address observed	Not observed		
Address	Layer	Type/ID	Comment/Name		
All-008B76C1		Micro/PC	Modified 3/1/95		
00122192-02C08C1BE106	Token-Ring	0001	ALLEGR0		
AL00C80E-C802	IPX	0001	Token Rings Labs		Ring
00122892-00608C21C29D	Token-Ring	0001	ALLSAR3 Client		
Andrew	IPX	0001	Group 2		
Cow---064E98	Token-Ring				
19.17.161.44	IP				
B1BM--74DBF1	Token-Ring	Micro/PC			
Broadcast	Token-Ring	Micro/PC			
C2600FFFFF	Token-Ring	Open View	Broadcast		
C2600000	Token-Ring	Open View			
C2600000	NetBIOS		C2600000		
C261001	Token-Ring	Open View			
C2601001	NetBIOS		C2601001		
C262002	Token-Ring	Open View			
C2602002	NetBIOS		C2602002		
C263003	Token-Ring	Open View			
C2603003	NetBIOS		C2603003		
Class Server	Token-Ring	File Serv	Modified 3/1/95		
00122192-030009253270	IPX	0004	CLASS SERVER		
CLASS SERVER	File Serv		Token Rings Labs		
00122892-00608C21C749	Token-Ring		Novell Server486		
Config Rpt. Srv.	Token-Ring	Micro/PC			
Config	Token-Ring	Micro/PC	Config.Rpt.Srv.		
Dante	Token-Ring	Micro/PC	Group 2		
3Cow---B001FF	Token-Ring	Micro/PC	Modified 3/1/95		
DANTE	IPX	0001	DANTE		
00608C21CAFE	Token-Ring	0001	Token Rings Labs		Ring
			DANTE3 Client		

Run from Capture Buffer complete 27 stations observed

New stations discovered with Station Discovery

```

+-----+-----+-----+-----+-----+-----+
| Station Discovery |
+-----+-----+-----+-----+-----+
| Control | Config | Display | Node/Station list | Print | Help |
+-----+-----+-----+-----+-----+
| All Stations |
+-----+-----+-----+-----+-----+
| Station New address Address observed Not observed |
+-----+-----+-----+-----+-----+
| Address | Layer | Type/ID | Comment/Name |
+-----+-----+-----+-----+-----+
| Lan Manager |
| C00000000000 | Token-Ring | Micro/PC | Lan Manager |
| NetBios Broadcast |
| 1B4---3A4B4F | Token-Ring | Micro/PC | NetBios Broadcast |
| Novell Broadcast |
| C00000000000 | Token-Ring | Micro/PC | Novell Broadcast |
| Parameter Server |
| C00000000000 | Token-Ring | Micro/PC | Parameter Server |
| Group 2 |
| Random |
| 15.17.100.47 | Token-Ring | Micro/PC | Random |
| Ring Error Mon. |
| C00000000000 | Token-Ring | Micro/PC | Ring Error Mon. |
| Site Gateway |
| Cisco-0034E4 | Token-Ring | Micro/PC | Cisco Gateway |
| Modified 3/1/95 |
| 18.2.73.88 | Token-Ring | Micro/PC | Naperville Advisor |
| Thomas |
| 15.31.16.50 | Token-Ring | Micro/PC | Naperville PC |
| William |
| 15.31.16.250 | Token-Ring | Micro/PC | William |
| new Cisco-0000EA |
| Cisco-0000EA | Token-Ring | Micro/PC | Cisco-0000EA |
| new DEC-00003B |
| DEC-00003B | Token-Ring | Micro/PC | DEC-00003B |
| new DEC-000020 |
| DEC-000020 | Token-Ring | Micro/PC | DEC-000020 |
| new Lasi-227E7B |
| Lasi-227E7B | Token-Ring | Micro/PC | Lasi-227E7B |
| new Lasi-0002BF |
| Lasi-0002BF | Token-Ring | Micro/PC | Lasi-0002BF |
| new Kinetic000020 |
| Kinetic000020 | Token-Ring | Micro/PC | Kinetic000020 |
| new Pro-0000541 |
| Pro-0000541 | Token-Ring | Micro/PC | Pro-0000541 |
+-----+-----+-----+-----+-----+
| Run from Capture Buffer complete | 27 stations observed |

```

When viewing stations using Station Discovery you can select, **[Display]** from the menu bar, and display stations in the following manner:

- Display all known stations
- Display observed stations only
- Display new stations and mapping changes only
- Display new stations only
- Display mapping changes but not new stations

Information in the Station Discovery window is color coded according to the line above the column headings.

- Black identifies the station name from the station list, or a name extracted from a frame seen on the network, or a default name.
- Red identifies an address not listed in the current station list, but which has generated traffic on the network.
- Green identifies an address in the current station list which has generated traffic on the network.
- Blue identifies an address listed in the current station list which has not generated traffic on the network.
- Gray identifies a new name observed for a network address that has not generated any traffic yet. If traffic is sourced from the address, the gray line changes to red.

Five main protocols that are discovered by Station Discovery:

- IP
- Novell
- DECnet
- NetBIOS
- XNS

2. Review the context sensitive Help text for more detailed information. From the Station Discovery window, select **[Help | Station Discovery topics]** from the menu bar.

3. After reviewing the Help text, press **[F5]** to close the Help text window.

Merge the New Stations

1. In the Station Discovery window, select [**Node/Station list | Merge selected records into Node/Station List**] from the menu bar. This appends/merges the new station list entries into a “clone” of *class.lst*, known as *current.lst*, which is invisible to the file manager. Select [**Yes**] and press [**Enter**] when the merge process presents the following question:

This action will add all addresses marked with a solid right arrow to your Node/Station list. It may require 1 second per address, or longer, with large lists. Do you want to do this?

2. Press [**F11**] to open the Node/Station List window.
3. From the menu bar, select [**Files | Save Node/Station List**] to save the current station list which includes the newly discovered stations.
4. Enter the file name [**temp.lst**] to save the station list. Then, from the menu bar, select [**Done | Accept selection and exit**].
5. Press [**F4 | I**] to iconize the Node/Station List window, and press [**F5**] to close the Station Discovery.

Create a Station List from Your Network

1. Press [**F11**] to open the Node/Station List window. From the menu bar, select [**Files | Load Node/Station List | Replace Node/Station List**].
2. Select the file [**c:\user\nodelist\empty.lst**] and from the menu bar, select [**Done | Accept selection and exit**]. Answer [**yes**] to the warning message and press [**Enter**].
3. Press [**F4 | I**] to iconize the Node/Station List.
4. In the Measurements window, Network Discovery category, click once on [**Station Discovery**]. From the menu bar, select [**Control | Run measurement from network**]. Station Discovery monitors frames seen on the network and displays new stations.
5. After some stations have been found, select [**Control | Switch to capture buffer**] from the menu bar. From the menu bar, select [**Node/Station List | Merge selected records into Node/Station List**].
6. Press [**F5**] to close the Station Discovery measurement. Open the Node/Station List by pressing [**F11**]. The discovered stations are in the current list.
7. From the menu bar, select [**Files | Save Node/Station List**]. File Manager window opens to the default directory *c:\user\nodelist*. Name your new station list and from the menu bar, select [**Done | Accept selection and exit**].
8. Press [**F4 | I**] to iconize the Node/Station List.

Station Discovery Configuration

You can control the display of Token-Ring addresses, the sorting criteria for displayed station and address records, and the posting of events to the Event Log.

View Station Discovery Configuration Items

1. From the Measurements window, Network Discovery category, select [Station Discovery] and press [Enter]. From the Station Discovery window, from the menu bar, select [Config | Configure Station Discovery].

If the Station Discovery measurement is still running when you open the Configuration window, some fields are grayed out; you can only view those current configuration item settings. Before changing those configuration items, you must stop the measurement.

Station Discovery configuration window

2. Examine the functions of Station Discovery's configuration items in the following table.

Configure Item	Function										
Show vendor names	<p>When enabled, addresses not present in the Node/Station List are displayed with the vendor name corresponding to the three most significant bytes of the Token-Ring address. The three least significant bytes of the Token-Ring address are displayed in hex. Vendor names can be added to the vendor dictionary by editing the file c:\analyzer\bundles\basic5\vmfgdict.nls.</p> <p>When disabled, Token-Ring addresses are displayed in hex.</p>										
Ignore address changes if	<p>When disabled, the Station Discovery measurement observes multiple higher level addresses for stations that are routers or gateways. This means that all network addresses, of frames routed by this device are associated with this device's MAC address.</p> <p>When enabled, this prevents the Station Discovery measurement from considering upper layer addresses to be address changes. To enable:</p> <ol style="list-style-type: none"> 1. Check the Router box to ignore address changes for stations that are router station type. 2. Check the Gateway box to ignore address changes for stations that are gateway station type. 										
Sort on	<p>To change the order in which station name and address records are displayed in the Station Discovery window. The following sort criteria are available:</p> <table> <tr> <td>Station Name</td><td>Sorts on the record name in the Station List. New station records are sorted (in the ascending sort) after all stations in the station list. New stations are given their Token-Ring physical address as a default name.</td></tr> <tr> <td>Station Type</td><td>Sorts on the Station Type attribute of the station. New station records receive a default Station Type of Micro/PC.</td></tr> <tr> <td>Physical Address</td><td>Sorts on the Token-Ring physical address.</td></tr> <tr> <td>Physical ID</td><td>Sorts on the Cable ID attribute of the station list. New station records do not receive a Cable ID and therefore are first in the sort order.</td></tr> <tr> <td>Physical Address Name</td><td>Sorts on the address record name associated with the Token-Ring physical address. New station records do not receive a physical name and therefore are first in the sort order.</td></tr> </table>	Station Name	Sorts on the record name in the Station List. New station records are sorted (in the ascending sort) after all stations in the station list. New stations are given their Token-Ring physical address as a default name.	Station Type	Sorts on the Station Type attribute of the station. New station records receive a default Station Type of Micro/PC.	Physical Address	Sorts on the Token-Ring physical address.	Physical ID	Sorts on the Cable ID attribute of the station list. New station records do not receive a Cable ID and therefore are first in the sort order.	Physical Address Name	Sorts on the address record name associated with the Token-Ring physical address. New station records do not receive a physical name and therefore are first in the sort order.
Station Name	Sorts on the record name in the Station List. New station records are sorted (in the ascending sort) after all stations in the station list. New stations are given their Token-Ring physical address as a default name.										
Station Type	Sorts on the Station Type attribute of the station. New station records receive a default Station Type of Micro/PC.										
Physical Address	Sorts on the Token-Ring physical address.										
Physical ID	Sorts on the Cable ID attribute of the station list. New station records do not receive a Cable ID and therefore are first in the sort order.										
Physical Address Name	Sorts on the address record name associated with the Token-Ring physical address. New station records do not receive a physical name and therefore are first in the sort order.										
Sort order	For all Sort On options, choosing Ascending results in a lowest-to-highest ordering. Choosing Descending results in a highest-to-lowest ordering.										

Search for names	<p>When selected (a checkmark is displayed), the Station Discovery measurement looks at the contents of packets to find network names for IP, IPX, and NetBIOS addresses. These names are shown under the Name/Comment column in the Station Discovery measurement. If you create a station list from the Station Discovery measurement, these names are used as the station name for their corresponding address.</p> <p>When not selected, the Station Discovery measurement does not find names for the addresses it discovers. This may reduce the clutter of the display and speed up the packet processing, especially if your network has a large amount of traffic from name servers.</p>	
Log new stations	<p>Lets you control the posting of new station events to the Event Log. A new station event occurs when a Token-Ring address is observed which is not present in the station list. The following options are available:</p>	
	Off	No event is posted. This is recommended for the first run of Station Discovery
	Normal Event	When a new station event occurs, an event is posted to the Event Log with the "normal" attribute. These events are green in the Event Log window.
	Warning Event	When a new station event occurs, an event is posted to the Event Log with the "warning" attribute. These events are yellow in the Event Log window.
	Alert Event	When a new station event occurs, an event is posted to the Event Log with the "alert" attribute. These events are red in the Event Log window.
Log mapping changes	<p>Lets you control the posting of new address events to the Event Log. A mapping change event occurs when a protocol address is observed which is not present for the associated Node/Station entry. The following options are available:</p>	
	Off	No event is posted.
	Normal Event	When a new address event occurs, an event is posted to the Event Log with the "normal" attribute. Normal events are green in the Event Log window.
	Warning Event	When a new address event occurs, an event is posted to the Event Log with the "warning" attribute. Warning events are yellow in the Event Log window.
	Alert Event	When a new address event occurs, an event is posted to the Event Log with the "alert" attribute. Alert events are red in the Event Log window.

*new label addresses	<p>Determines how '*new' station names are displayed in the Station Discovery window. When you select and enter an address format from the choices in the list pane, a '*new' type station is displayed when an address is observed on the network, but there is no corresponding name available.</p> <p>For example:</p> <p>If the value of this field is IP, Token-Ring, and if an IP address is found, the format for the '*new' address is *new 15.17.140.201.</p> <p>If an IP address cannot be found, the '*new' address is *new 000800A13223 for an Token-Ring address.</p>
Maximum station count	<p>Determines how many stations can be listed in the Station Discovery window. The current station list is automatically inserted in the Station Discovery window. The valid range of values for this field is from 100 to 8000.</p>

Addresses and Names Found by Station Discovery

Station Discovery finds all addresses on the local network. MAC addresses, as well as network layer addresses are found. The Station Discovery window shows new stations discovered and stations already entered in the station list.

Token-Ring addresses (MAC or physical address) are reported when they are first observed in the source address field of a legal Token-Ring frame. Addresses are also discovered for the following protocols:

- Internet Protocol (IP)
- Netware Internet Packet Exchange Protocol (IPX)
- DECnet
- IBM NetBIOS Protocol (NetBIOS)
- Xerox Network Services Internet Datagram Protocol (XNS)

Each discovered network layer address is displayed on an indented address line. The associated station is determined by the Token-Ring address of the frame carrying the traffic. Note that for the NetBIOS protocol, the address is considered to be the unique ASCII name representing a NetBIOS station. These names are usually transmitted only during the boot process of a NetBIOS station.

In addition to discovering addresses as stations generate traffic on the network, the Internet Advisor for Token-Ring also associates names assigned by the system administrator to addresses when it can. Some protocols such as IP, IPX, and NetBIOS send packets from which names can be extracted. The Internet Advisor for Token-Ring finds these "friendly" names and lets you use them instead of the default station names.

Load and Print the Station List

Before performing the following procedures, verify that the printer is configured correctly by referring to Chapter 1, page 11.

Load the Station List

1. Press **[F11]** key to open the Node/Station List. From the Node/Station List window, select **[Files | Load Node/Station List | Replace Node/Station List]** and press **[Enter]**.
2. From the Files pane, select the desired station list file that you'd like to print, then from the menu bar, select **[Done | Accept selection and exit]**.

Print the Station List

1. In the Measurements window, Station Discovery category, click on **[Station Discovery]** and press **[Enter]**. The Station Discovery window opens and displays stations in your station list.
2. From the menu bar, select **[Display | Display all known stations]**. This will ensure that all stations in the station list are being displayed.
3. From the menu bar, select **[Print | Print all displayed records]**. If you have a printer configured and connected, your station list will print. If your Internet Advisor is configured to print to file, then File Manager opens and you can copy the station list to an ASCII file on the hard drive or floppy disk.
4. Press **[F5]** to close Station Discovery.

Tune the Discovery Process Using Filters

You can tune the discovery process using filters.

For example:

- **Filter #1—Server filter used for Station Discovery**
You could create a filter that will capture frames to or from a file server. With this MAC "hardware" filter, you would build a station list of all stations accessing the server.
- **Filter #2—IP filter used for Station Discovery**
To discover stations sourcing frames within a particular network subnet, for example, our network uses a 15.6.73.XX subnet. So, if you created a Basic IP Filter that specified frames sourced by station 15.6.73.XX, you would discover stations using IP addresses 15.6.73.0 up to 15.6.73.255. This would assist us in locating duplicate IP addresses.

Chapter Notes

Chapter Notes

Chapter 3 - Filters

Objective

The HP Internet Advisor captures every frame, regardless of the traffic level. This capability is absolutely necessary for accurate performance characterization, but sometimes you may want to focus the Internet Advisor on a particular problem. Use the Internet Advisor filtering capability to capture only the frames you need to see.

Filtering allows you to efficiently use the data capture buffer, as well as your own time by presenting only those frames that are related to the problem at hand. For example: If users are reporting a recurring problem with a print server, you could begin troubleshooting by capturing only the traffic to and from that server. Now all Internet Advisor measurements examine the frames that show you how the server is responding to print requests.

In this chapter, you will learn how to use existing hardware filters, create new custom filters, and activate the filters to allow for selective data capture.

Topics Covered

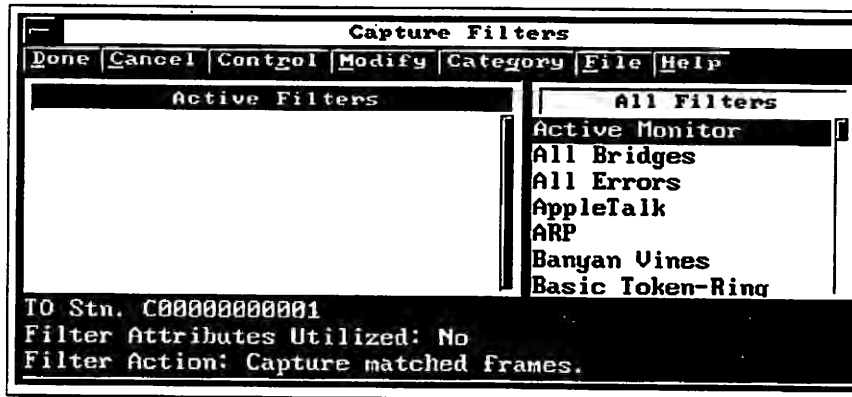
- Capture Filter window
- Filter categories
- Creating a Token-Ring router filter
- Creating an IP filter for a station conversation
- Creating an IPX filter to examine a server
- Activating and deactivating filters
- Copy and delete custom filters

Preparation

- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.
- The Station List `c:\user\class\class.lst` should be loaded.

View the Capture Filters Window

The Capture Filters window allows you to select the data filters you want to use when capturing data. In the Capture Filters window, you select which frames are to be stored into the capture buffer.



Capture Filters window

- **Status Icons** - Of the eight graphic icons in the status panel in the lower right corner of the screen, the Filters icon is second from the left in the top row. When the icon is black, the filters are active. When the icon is white, the filters are inactive. Clicking on the icon will turn the filters on or off. Filters are defined in the Filters window.

The Advisor is preprogrammed with the following predefined Token-Ring filter templates:

Token-Ring Filter Types			
Active Monitor	CLNP (Token-Ring)	LLC	OSPF
All Bridges	Configured Report Server	LLC Routing	Parameter Server
All Errors	Damaged Frames	LLC Routing 1 Bridge	Ping
AppleTalk	DEC LAT (Snap)	LLC Routing 2 Bridge	ARP
ARP	DEC LAVC (Snap)	LLC Routing 3 Bridge	Ring Error Monitor
Banyan Vines	DEC LTM (Snap)	LLC Routing 4 Bridge	RIP (Dest.)
Basic Token-Ring	DEC MOP (Dump/Load)	LLC Routing 5 Bridge	RIP (Source)
Basic Token-Ring DDP	DEC MOP (Remote)	LLC Routing 6 Bridge	SNA (04)
Basic Token-Ring DRP	DECnet IV (Snap)	LLC Routing 7 Bridge	SNAP (AA)
Basic Token-Ring IP	FTP	LLC Routing 8 Bridge	Source Routed
Basic Token-Ring IPX	IBM NetBIOS (F0)	NetBIOS Broadcast	TCP/IP SNAP
Basic Token-Ring TCP	IBMNm (F4)	Netware (E0)	Telnet
Basic Token-Ring VIP	IGRP	Novell SNAP	Tokens
BPDu (42)	LAN Manager Broadcast	Novell Broadcast	UDP
Broadcast		Novell RIP	
		Novell SAP	

Filter Data Using Addresses, Attributes, and Actions

You can filter data by assigning a MAC level, IP, or IPX (Novell) network level address for each filter, and then combine these addresses to capture data in the following traffic modes:

- traffic from station 1
- traffic to station 1
- traffic to or from station 1
- traffic from station 1 to station 2
- traffic from station 2 to station 1
- traffic between station 1 to station 2
- from station 1 to Multicast (Basic Token-Ring Capture Filter only)

You can also filter frames by their attributes. For Token-Ring, frame attributes include:

- Good Frames
- Ring Purge
- Claim Token
- Beacon
- Remove Ring Station
- Incomplete Neighbor Notification
- Active Monitor Error
- Soft Error
- Abort Delimiters
- Source Routed
- Non-Source Routed
- No End Delimiter
- Bad FCS Frames
- E-bit Set
- Priority Frames
- Tokens
- All MAC frames

For additional filter capabilities, you can specify 48 bytes of data after the last filter field from the first page of the filter configuration.

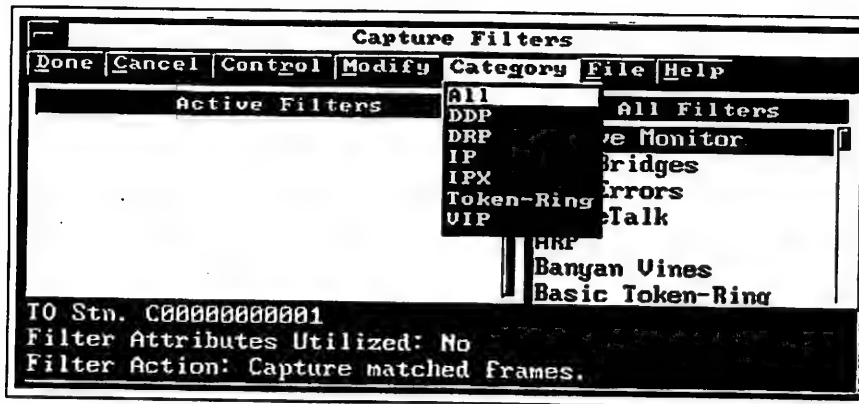
Example 1: In the Basic Token-Ring filter, the first page of the filter configuration window allows you to configure the source and destination addresses. On page two, byte 0 of the 48 bytes starts immediately after the source address in a Token-Ring frame.

Example 2: In the Basic Token-Ring IPX filter the first page of the filter configuration window allows you to configure the network layer addresses and other network layer fields. On page two, byte 0 of the 48 bytes starts at layer 4, the transport layer - NCP.

Filter Categories

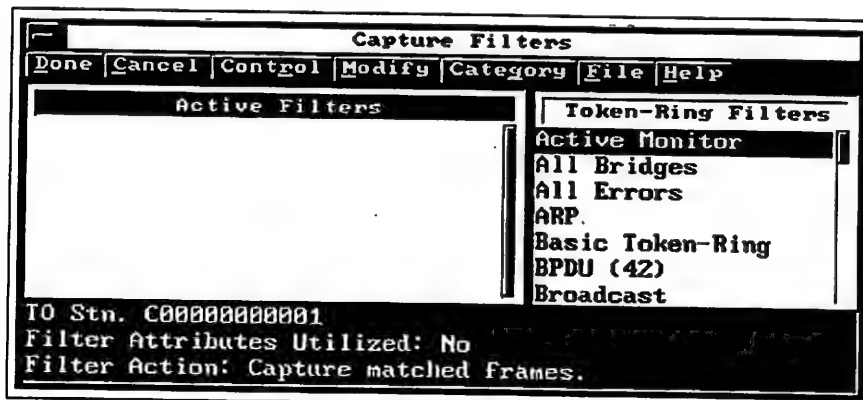
The following figure shows the filter categories available when you select the Category menu item.

1. Open the Filters window by pressing [F12] or clicking on the **FILTERS** icon. From the menu bar, select [Category | All] to view all the filters.



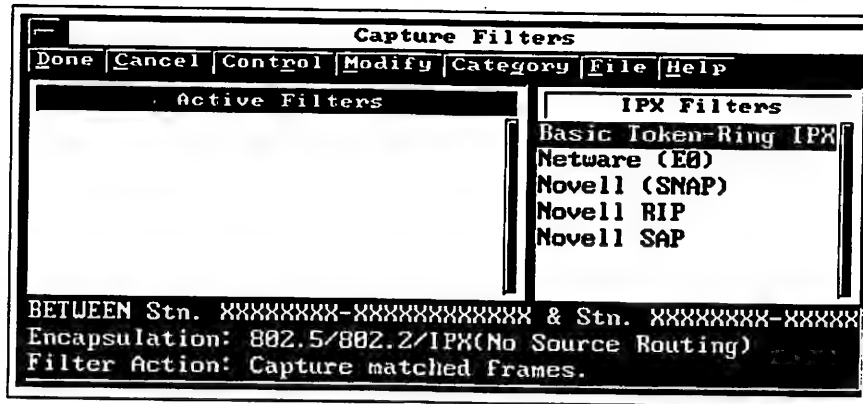
All Filters

2. From the menu bar, select [Category | Token-Ring] to view the Token-Ring filters.



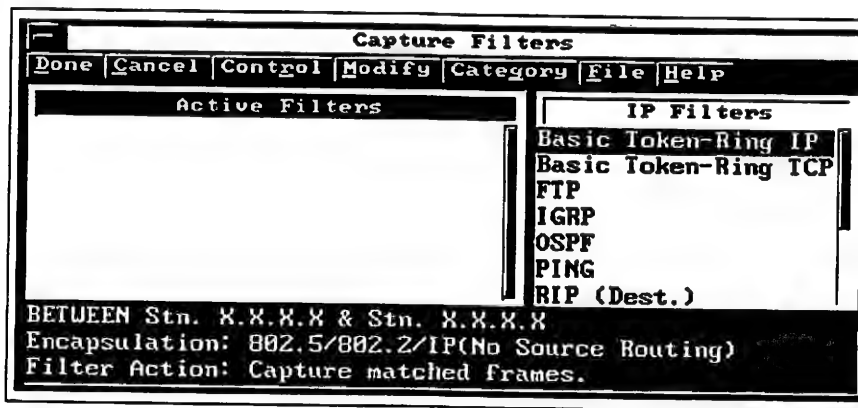
Token-Ring Filters

3. You can also select [Category | IPX] to view the IPX filters.



IPX Filters

4. Or you can select [Category | IP] to view the IP filters.



IP Filters

Create, Save and Name a Token Ring Router Filter

To create a new filter, you must first select an existing filter, then modify it, and save it using a new name.

1. Double click on the **FILTERS** icon at the bottom of the screen, or press **[F12]** to open the Capture Filters window.
2. From the menu bar, select **[Category | Token-Ring]**. Cursor down to the **[Basic Token-Ring]** filter, then press **[Enter]**. A new window will be displayed to allow you to modify the filter information.
3. From the Station 1 Address field, tab to the Node/Station List pane. The first station in the list should be "Site Gateway". Type **[nov]** and the "Novell Server486" will be highlighted. Press **[Enter]** key and notice that the MAC address 00608C21C749, for that station, is automatically chosen from the Node/Station List.
4. Cursor down to the Traffic Mode and select **[TO or FROM Stn 1]** from the traffic mode pane. Cursor down to the Frame Attributes field and press **[Enter]** until the check mark disappears.

Basic Token-Ring Capture Filter	
<div> <div>Done</div> <div>Cancel</div> <div>Defaults</div> <div>Page</div> <div>Save</div> <div>Format</div> <div>Help</div> </div>	
Page 1 of 2	
Station Address:	
Station 1 Address	00608C21C749
Station 2 Address	XXXXXXXXXXXX
Traffic Mode	TO or FROM Stn 1
Frame Attributes	<input type="checkbox"/>
Filter Action	Capture matched frames
<div>More ↓</div>	
<div>Node/Station List</div> <div> <div>[0000308034E4], Site Gate</div> <div>[00608C21C29D], Allegro.5</div> <div>[00608C21C749], Novell Se</div> <div>[00608C21CAFE], Dante.5</div> <div>[10005A3A4B4F], NEC 2</div> <div>[10005A742D7E], Dave</div> <div>[10005A74DBF1], Bill</div> <div>[100090205A2B], Randy</div> <div>[10009040D503], C2600V0</div> <div>[10000040F431], C2600V0</div> </div>	
Type an address and press Enter. Or press F3, highlight an item, and press Enter.	

Basic Token-Ring Filter configured to filter traffic to or from the Novell Server

5. From the menu bar, select **[Save | Save to new filter]**. Enter the new filter name, such as "Novell Server & Router", then press **[Enter]**. After saving your custom filter, restore your Basic Token-Ring Filter to default values. From the menu bar, select **[Cancel | Cancel changes and exit]**. The Capture Filters window will be displayed. Your new filter will be in the All Filters pane and the Basic Token-Ring Filter will still be available for future use.

Create, Save and Name an Internet Protocol IP Conversation Filter

To create a new filter, you must first select an existing filter, then modify it, and save it using a new name.

1. Click on the **FILTERS** icon, or press **[F12]** to open the Capture Filters window.
2. From the menu bar, select **[Category | IP]**. Select the **[Basic Token-Ring IP]** filter, then press **[Enter]**. A new window is displayed to allow you to modify the filter information.
3. Select the Station 1 Address field, tab to the Node/Station List pane, and type **[ftp]** for FTP Server, then press **[Enter]**. Notice that the IP address 15.17.160.65 is automatically chosen from the Node/Station List. Now cursor to the Station 2 Address field, tab to the Node/Station List pane and type **[th]** for Thomas and press **[Enter]**. Its IP address is 15.31.16.50.
4. Cursor down to the Traffic Mode and select **[Between Stn 1 & Stn 2]** from the traffic mode pane. Cursor down to the Frame Attributes field and press **[Enter]** until the check mark disappears.

Basic Token-Ring IP Capture Filter		Node/Station List
Encapsulation	802.5/802.2/IP	[15.6.72.11], Jim
Source Routing	<input type="checkbox"/>	[15.6.72.85], Connie
Bridges	All	[15.6.72.102], Jerry
IP Station Address:		[15.6.73.65], hpctdpy
Station 1 Address	15.17.160.65	[15.6.73.88], hpctdpy
Station 1 Addr Mask	255.255.255.255	[15.6.73.123], hpctdpy-00
Station 2 Address	15.31.16.50	[15.6.74.31], Cisco Gateway
Station 2 Addr Mask	255.255.255.255	[15.6.74.60], Finance Ser
Traffic Mode	BETWEEN Stn 1 & Stn 2	[15.6.74.71], Jim
Frame Attributes	<input type="checkbox"/>	[15.17.160.65], Ftp Server
Filter Action	Capture matched frames	[15.17.160.77], Randy
Time To Live < :	256	[15.17.161.31], Eric
Next Protocol# (Hex):	PX	[15.17.161.44], Andrew
		[15.31.16.11], Division Ro
		[15.31.16.50], Thomas
		[15.31.16.250], William

IP Filter configured for traffic between Ftp Server and Thomas

5. From the menu bar, select **[Save | Save to new filter]**. Enter the new filter name, such as "Ftp Server & Thomas", then press **[Enter]**. After saving your custom filter, restore your Basic Ethernet IP Filter to default values. From the menu bar, select **[Cancel | Cancel changes and exit]**. The Capture Filters window will be displayed. Your new filter will be in the All Filters pane and the Basic Token-Ring IP Filter will still be available for future use.

Note: Refer to page 9 for information pertaining to the Encapsulation field.

Create, Save, and Name an Token-Ring IPX Filter

To create a new filter, you must first select an existing filter, then modify it, and save it using a new name.

1. Click on the **FILTERS** icon, or press [F12] to open the Capture Filters window.
2. From the menu bar, select [Category | **IPX**]. Select the [**Basic Token-Ring IPX**] filter, then press [Enter]. A new window will be displayed to allow you to modify the filter information.
3. Select the Station 1 Address field, then tab to the Node/Station List pane. Type [dan] for Dante and press [Enter]. Notice that the IPX address 00122192-02608C0D80FF is automatically chosen from the Node/Station List. Now cursor to the Station 2 Address field, tab to the Node/Station List pane, type [cl] for Class Server, and press [Enter]. Its address will be filled in.
4. Cursor down to Traffic Mode field and select [**Between Stn 1 & Stn 2**]. Cursor down to the Frame Attributes field and press [Enter] until the check mark disappears.

IPX Filter configured for traffic between Dante and Class Server

5. From the menu bar, select [Save | **Save to new filter**]. Enter the new filter name, such as "Dante & Server", then press [Enter]. After saving your custom filter, restore your Basic Ethernet IPX Filter to default values. From the menu bar, select [Cancel | **Cancel changes and exit**]. The Capture Filters window will be displayed. Your new filter will be in the All Filters pane and the Basic Token-Ring IPX Filter will still be available for future use.

Note: Refer to page 9 for information pertaining to the Encapsulation field.

Filter Encapsulation

Encapsulation lets you choose the lower layer protocol that encapsulates the IP or IPX protocol on your network. Try to select only the protocol encapsulation your network uses. This helps the Internet Advisor efficiently use the hardware needed for the filtering operation. If you do not know what encapsulation is used with either the IP or IPX packets on your network, select *All*, and the Internet Advisor will filter on all the protocols listed:

For the Basic Token-Ring IP filter, you can select from the following encapsulation methods:

- All
- 802.5/802.2/IP
- 802.5/802.2/SNAP/IP

For the Basic Token-Ring IPX filter, you can select from the following encapsulation methods:

- All
- 802.5/802.2/IPX
- 802.5/802.2/SNAP/IPX

Activate or Deactivate a Filter

Activate a Filter

1. In the Capture Filters window, All Filters pane, cursor to the filter that you wish to activate and from the menu bar, select **[Control | Activate filter]**. You may activate several filters one at a time; they operate logically as an implied "OR" function. To exit, select **[Done | Accept changes and iconize]** from the menu bar.

Deactivate a Filter

1. In the Capture Filters window, Active Filters pane, cursor to the filter that you wish to deactivate, and from the menu bar, select **[Control | Deactivate filter]**. You may deactivate several filters one at a time. To exit select **[Done | Accept changes and iconize]** from the menu bar.

Filters can be easily activated or deactivated by simply clicking once on the filter icon field in the green status icons. Be sure that no measurements are running when activating or deactivating a filter.

Activating Multiple Filters

A maximum of 16 filters can be loaded and active simultaneously. When multiple filters are activated, the Internet Advisor captures frames that are the union of the activated filters.

For example:

- Two filters are created to **capture** matched frames.
 - Filter #1 traffic mode is defined as "to or from station 1".
 - Filter #2 traffic mode is defined as "to or from station 2".
 - The filter action for both filters is set to capture matched frames.
 - When these two filters are activated, the Internet Advisor captures all frames going to or coming from either node 1 or node 2.
- Two filters are created to **exclude** matched frames
 - Filter #1 traffic mode is defined as "to or from station 1".
 - Filter #2 traffic mode is defined as "to or from station 2".
 - The filter action for both filters is set to exclude matched frames.
 - When these two filters are activated, the Internet Advisor captures all frames, as well as the frames going to or coming from nodes 1 and 2, because each received frame is checked by all of the activated filters in parallel. While one filter may reject a frame, if another filter accepts the frame, it is saved in the capture buffer. For this reason, *we recommend that only one filter be active when you are excluding matched frames.*

Restoring Default Filter Values

Restoring Defaults is used to restore default values to a pre-defined filter.

For example:

1. In the Capture Filters window, you choose to modify the Basic Token-Ring capture filter.
2. You then insert two new physical station addresses for station 1 and station 2.
3. The next time you use the Basic Token-Ring filter it would have two physical layer addresses instead of don't care characters. To restore the filter to its original settings, from the Capture Filters window, select **[Modify | Filter]**. From the filter window restore default values by selecting **[Defaults | Restore default values]** from the menu bar then selecting **[Done | Accept changes and exit]**. The filter will be restored to factory settings.

Copy and Delete Custom Filters

Copy Custom Filters

After creating a new filter, you may want to load it on another Internet Advisor for Token-Ring. This can save you the time of re-creating the filter, and can ensure filters are identical on each Internet Advisor.

1. In the Capture Filter window, from the menu bar, select [**Category | All**]. Type the name of your filter. It will be automatically highlighted when a match is found.
2. From the menu bar, select [**File | Save user filter**]. The File Manager application will appear. You can save the filter to floppy by selecting, from File Managers menu bar, [**Drive | a:**], and enter a valid MS-DOS^(R) filename, then from the menu bar select [**Done | Accept selection and exit**]. This will copy your custom filter to a floppy disk.

Loading Your Filter on Another Internet Advisor

1. Open the Capture Filters window by pressing [**F12**], or double click on the **FILTERS** icon.
2. From the menu bar, select [**Category | All**]. From the menu bar, select [**File | Load user filter**]. File Manager will appear.
3. Insert the floppy disk containing the custom filter into the Internet Advisor's A drive. From the File Managers menu bar, select [**Drive | a:**], select the appropriate file, then from the menu bar select [**Done | Accept selection and exit**]. Your custom filter will be loaded into the Internet Advisor filter list.

Note: Saving the filter to disk requires you to use a valid DOS filename. When you load the filter back into your Internet Advisor or another Internet Advisor, the original filter name is retained. The DOS filename is only required when copying the filter.

Delete Custom Filters

To delete a custom filter from the All Filters pane, follow the instructions below:

1. Open the Capture Filters window by pressing [**F12**] or double click on the **FILTERS** icon.
2. From the menu bar, select [**Category | All**]. Type the name of your filter until it is found.
3. When the filter is found and highlighted, select from the menu bar [**Control | Delete user filter**]. You will be asked if you really want to delete the filter.

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Chapter Notes

Chapter 4 - Expert Advisor

Objective

The Expert Advisor provides an immediate graphical representation of your network's health. A single screen displays the results of Vital Signs, Protocol Statistics, Commentators and Station Discovery measurements, plus a continuous plot over time of network utilization and network health. Network health provides a quick, visual indicator of the general soundness of the LAN. Network health is measured by tracking warning and alert events (from Commentators) and errored frames (from Vital Signs) as they are observed on the network. A perfect network would have a health rating of 100 percent. However, running Expert Advisor on a real network, each error, warning and alert event reduces the network health percentage by a user-defined weighting factor. Normally, as network utilization rises, network health decreases. If network health decreases dramatically or drops during times of low utilization, your network probably has a significant problem.

Expert Advisor allows you to quickly identify potential network problems and drill down to the information needed to resolve those problems. If you had to diagnose and repair your network using only one measurement in the Internet Advisor, this would be the one.

In this chapter, you will learn to configure the Expert Advisor and to use it to become more productive at troubleshooting and managing your network.

Topics Covered

- Expert Advisor overview
- Examine Expert Advisor screen and fields
- Drill down capability
- Examine drill down capability
- Using the Expert Advisor to troubleshoot a network problem
- Configuring Expert Advisor

Preparation

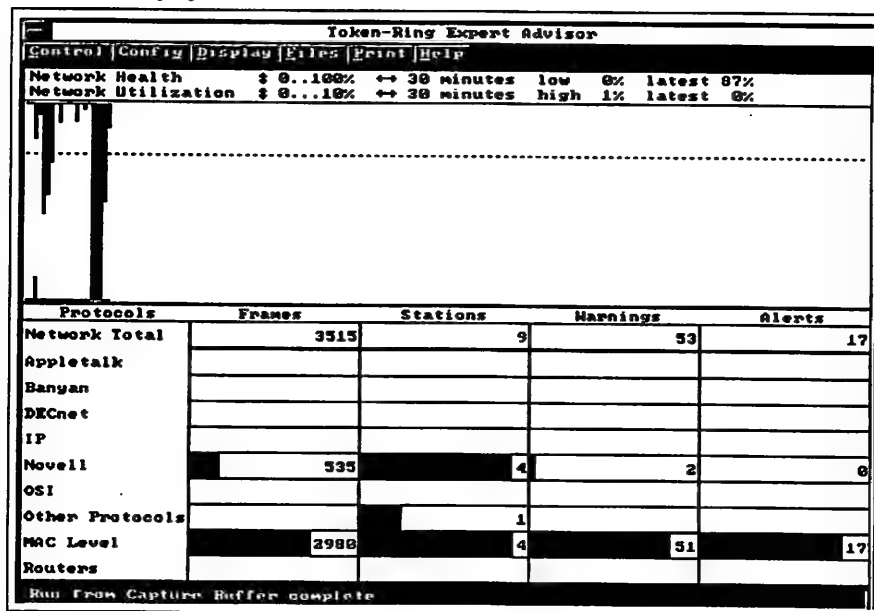
- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.
- The Station List `c:\user\class\class.lst` should be loaded.
- The Advisor Data File `c:\user\class\comm.tr` should be loaded into the capture buffer.

Expert Advisor Overview

The Expert Advisor transforms data into meaningful information. It constantly monitors the traffic on your Token-Ring, and reduces thousands of frames to a handful of significant events. It watches continuously for router misconfigurations, slow file transfers, inefficient window sizes, connection resets, and hundreds of other problems. And it does this for each protocol stack you have running, all in real time -- as events occur.

Event summaries tracked by the Expert Advisor are categorized by protocol stack, so you can quickly isolate problems to specific protocols.

1. From the Measurements window, Expert Advisor category, select **[Token-Ring Expert Advisor]** and press **[Enter]**. Notice that the Expert Advisor window is displayed, and four icons appear at the bottom of the screen, indicating that an additional four measurements have started running.
2. From the menu bar, select **[Config | Configure Token-Ring Expert Advisor]**. From the configuration window, select **[Defaults | Restore default values]**, and then select **[Done | Accept changes and exit]**.
2. From the Expert Advisor menu bar, select **[Control | Run Measurement From Capture Buffer | All Frames]**. Expert Advisor may require approximately 30 seconds to re-play the capture buffer and display the results.



Token-Ring Expert Advisor window

Note: Protocols displayed in gray indicate that no frames of that type were observed on the network when the measurement was run.

Examine Expert Advisor Screen and Fields

The Expert Advisor's screen updates every 10 seconds. Network Health and Network Utilization can be plotted over a 30 minute period. The *comm.tr* Advisor Data File contains information captured from monitoring a network for 3 minutes, therefore, the Network Health and Network Utilization plots in the example on the previous page are short. Also, many frame errors occurred in the replayed data. Note that in the number of Warnings and Alerts versus the number of frames seen, that is why Network Health had a low of zero percent. The algorithm for calculating Network Health is user configurable. Configuring the Expert Advisor will be covered later in this chapter.

The top portion of the Expert Advisor window shows both Network Health and Network Utilization. The bottom of the screen provides information on Protocols, Traffic, Stations, Warnings, and Alerts.

Most networks have several protocols operating concurrently. However, most network problems, other than physical layer problems, are related to a specific protocol. Even though each protocol can operate on your network simultaneously, each protocol operates as a separate logical network. Expert Advisor monitors the network and displays all the information by protocol to help you quickly understand and troubleshoot any problems. The table below describes each field in detail:

Expert Advisor field	Description
Protocol	Displays the protocols seen on the network under test. If a protocol field is grayed out, then no frames for that protocol stack have been observed.
Traffic: Displayed in Frames, Bytes, % Utilization, Bytes/sec, or Frames/sec.	Traffic can be displayed in frames, bytes, percent utilization, bytes a second, or frames a second. The default is frames, as in the previous example. The Network Total field displays total traffic observed from all protocols. The individual protocol fields have a traffic count corresponding to that protocol stack.
Stations	The Network Total field contains a count of all observed stations on the network under test. The individual protocol fields have a count of observed stations with network layer addresses corresponding to that protocol stack.
Warnings	The Network Total field contains a count of all Warning events observed on the network under test. The individual protocol fields have a count of all Warning events observed for that protocol stack.
Alerts	The Network Total field contains a count of all Alert events observed on the network under test. The individual protocol fields have a count of all Alert events observed for that protocol stack.

Drill Down Capability

Expert Advisor's drill down capability allows you to access many of the measurements in the Internet Advisor. From the Expert Advisor, other measurements can be started simply by clicking on the Expert Advisor field of interest. Move the mouse pointer over the Expert Advisor fields, and watch it change from a pointer to a magnifying glass, which indicates that a drill down measurement is available.

If you don't have a mouse connected to the Internet Advisor you can still drill down to additional measurements. From the Expert Advisor's window, the **[Display]** option is available from the menu bar. Select **[Display]**, and then you can select **[Utilization, Protocols, Traffic, Stations, Warnings, or Alerts]**.

The table below describes each drill down field in the Expert Advisor and the measurement started. The Warnings and Alerts fields have multiple drill down levels.

Expert Advisor field	Measurement started
Utilization	Starts Station Stats -- displays which nodes are talking on the network.
Protocol	<p>Network Total field starts Protocol Stats configured to display all protocols by type and SAP.</p> <p>Individual Protocol fields, i.e., AppleTalk, IP, etc., start Protocol Stats configured to display only that protocol stack. If you drill down from IP Protocol, the Protocol Stats measurement will display FTP, WHO, ICMP, Telnet and any other IP types.</p>
Traffic:	Network Total field starts Token-Ring Vital Signs.
Displayed as Frames, Bytes, % Utilization, Bytes/sec, or Frames/sec.	Individual Frame fields, i.e., AppleTalk, IP, etc., start the individual Vital Sign measurement. If you drill down from IP frames, the TCP/IP Vital Signs will start.
Stations	<p>Network Total field opens the Station Discovery measurement and displays all observed nodes.</p> <p>Individual Station fields, i.e., AppleTalk, IP, etc., open the Station Discovery measurement configured to display observed nodes with network layer addresses matching that protocol stack. If you drill down from IP Stations, Station Discovery will display only observed Stations that have IP layer addresses.</p>

Warnings	<p>Network Total field opens the Commentator measurement and displays a summary of warning events for all protocols.</p> <p>Individual Warning fields, i.e., AppleTalk, IP, etc., open the Commentator measurement and display a summary of warning events for that protocol stack. If you drill down from IP Warnings, Commentator will open and display, in summary, all IP Warning events.</p> <p>Additional drill down capabilities are available from the Commentator window. From the summary of warning events, further drill down can provide detailed Commentator information, and even further drill down can provide help text about the warning event or a decode display showing detailed information about the frame that caused the warning event.</p>
Alerts	<p>Network Total field opens the Commentator measurement and displays a summary of alert events for all protocols.</p> <p>Individual Alert fields, i.e., AppleTalk, IP, etc., open the Commentator measurement and displays a summary of alert events for that protocol stack. If you drill down from IP Alerts, Commentator will open and display, in summary, all IP Alert events.</p> <p>Additional drill down capabilities are available from the Commentator window. From the summary of alert events, further drill down can provide detailed Commentator information, and even further drill down can provide help text about the alert event or a decode display showing detailed information about the frame that caused the alert event.</p>

Detailed information on each of these additional measurements can be found in other chapters of this manual. Refer to chapter 2 for information on Station Discovery, chapter 5 for information on Station Stats or Protocol Stats, chapter 6 for information on the Vital Signs, and chapter 7 for information on the Commentators.

Examine Drill Down Capability to Other Measurements

Your Internet Advisor should still have the Expert Advisor window open, and the Advisor Data File *comm.tr* should have been replayed, as in the example on page 2 of this chapter.

In this section, several Internet Advisor measurements will be started using the drill down function in the Expert Advisor.

In the following example, you may use a mouse to point at a field and double click to drill down or you may use the Expert Advisor screen menu bar by selecting **[Display]** and selecting the appropriate display option. In the following examples, measurements are performed using a mouse.

Review Network Total -- Frames

1. On the Expert Advisor screen, notice that Network Total for Frames is 3515. To review more detailed information about those frames, position the mouse pointer directly over the Frames count. Notice the mouse pointer changes to a magnifying glass. Double click the mouse so that the Token-Ring Expert Advisor Vital Signs are displayed. Since the Expert Advisor replayed data from an Advisor Data File, the Vital Signs measurements automatically replays the same data.

Token-Ring Expert Advisor Vital Signs					
Control Config Print Help					
Token-Ring Vital Signs					
	Threshold	Current	Average	Peak	Total
NETWORK COUNTS (Pre-Filter)					
Utilization %	30	0.00	0.31	6.26	
Frames	1000	1	16	247	3565
Bad FCS	0	0	3	21	131
Code Violations	10	0	3	21	133
Aborts	10	0	1	9	50
Tokens	1300000	0	0	0	0
BUFFER COUNTS (Post-Filter)					
Utilization %	30	0.00	0.31	6.26	
Frames	1000	1	16	247	3565
Code Violations	10	0	3	21	133
Aborts	10	0	1	9	50
Rev Congestion	10	0	0	0	0
Burst Errors	10	1	0	2	16
Line Errors	10	0	0	1	2
Soft Errors	10	1	0	3	22
Beacons	10	0	0	50	2262
Claim Tokens	10	0	0	49	125
Ring Purges	10	0	10	76	334
Missed frames	100	0	0	0	0
Start Time: Mar 1 95 @ 10:43:02					
Sample Time: Mar 1 95 @ 10:46:25					
Stopped, Analyzer Data File.					

Token-Ring Expert Advisor Vital Signs

The Vital Signs measurements give you detailed information about the traffic observed on the network. Physical layer problems can also be quickly identified with the Token-Ring Vital Signs measurement. Context-sensitive help text is available in this, and all other measurements in the Internet Advisor for Token-Ring. Review the help text for a detailed description of each field in the Vital Signs measurement.

2. Press [F5] to close, or iconize the Vital Signs measurement window.

Review Novell -- Frames

3. On the Expert Advisor screen, the Novell Frames count is 535. Position the mouse on the Novell Frames count and double click. The Novell Vital Signs automatically runs. These Vital Signs measurements provide you with detailed information about the Novell frames observed on the network.

Novell Vital Signs					
Control | Config | Print | Help					
Novell Vital Signs					
	Threshold	Current	Average	Peak	Total
Network Util %	10	0.00	0.31	6.26	
IPX Util %	10	0.00	0.00	6.26	
Network Packets	1200	1	16	247	3565
IPX Packets	1000	0	0	247	535
IPX Packet Size	1000	0	3	612	
Local Tx Rate	1000	0	0	247	535
Remote Tx Rate	1000	0	0	0	0
Burst Mode	500	0	0	0	0
RIP Frames	10	0	0	2	7
SAP Frames	10	0	0	2	8
Read Rq Pkts	500	0	0	71	142
Write Rq Pkts	500	0	0	0	0
Busy Server %	4	0	0	0	0
Missed Frames	100	0	0	0	0
Start Time: Mar 1 95 @ 10:43:02					
Sample Time: Mar 1 95 @ 10:46:25					
Stopped, Analyzer Data File.					

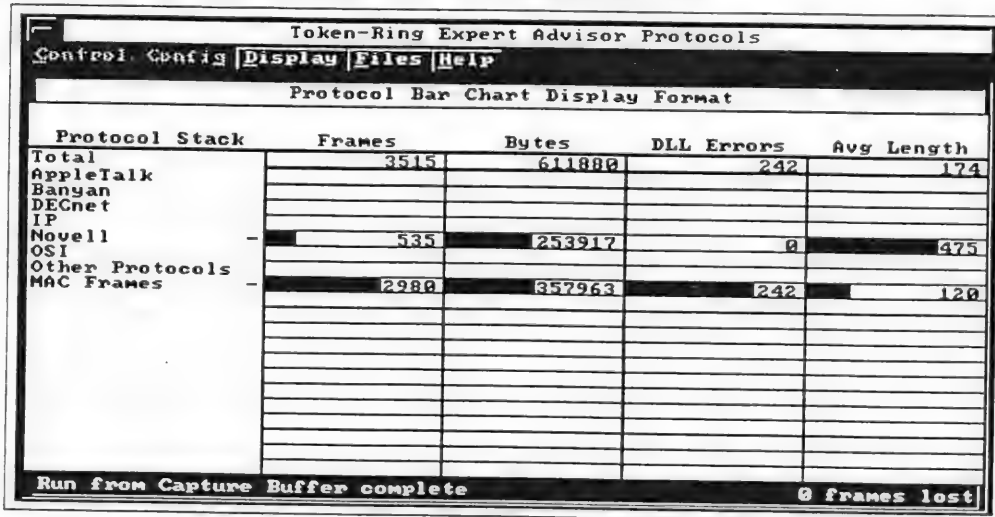
Novell Vital Signs

Your network may run other protocols, such as AppleTalk, TCP/IP or Banyan. A Vital Signs measurement is available for each protocol stack.

4. Press [F5] to close the Novell Vital Signs measurement.

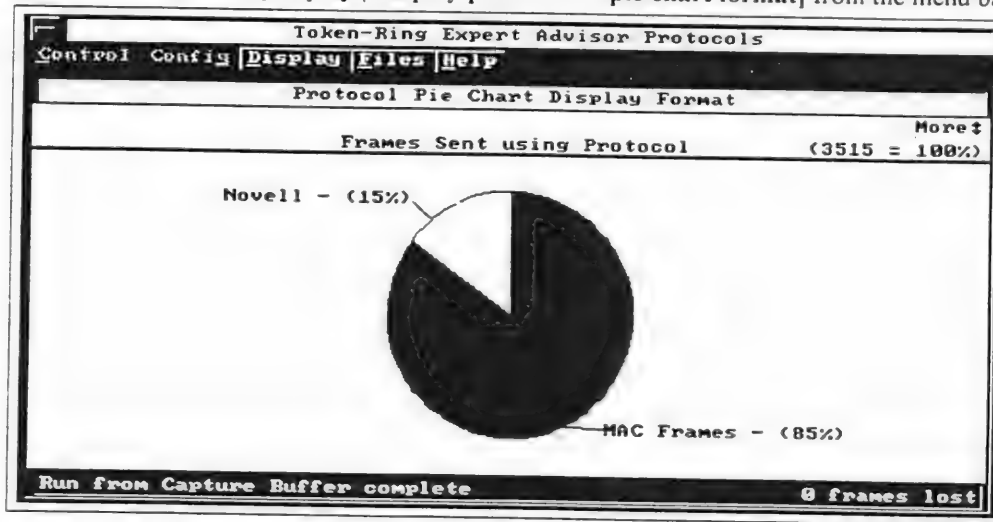
Review Network Total -- Protocols

5. Position the mouse pointer over the Network Total field in the Protocols category, and double click. The Token-Ring Expert Advisor Protocols measurement runs.



Token-Ring Expert Advisor Protocols

The Token-Ring Expert Advisor Protocols provides detailed information about all the protocol stacks observed on your network, including frame length distribution. This information can be displayed in bar-chart or pie-chart format. To display in pie-chart format, or to display frame length distribution, select **[Display | Display protocols in pie chart format]** from the menu bar.

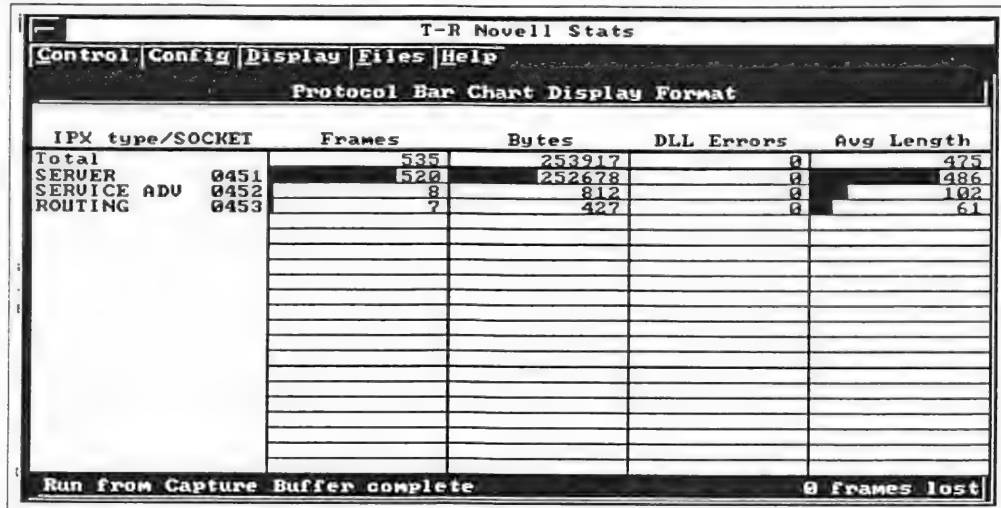


Token-Ring Expert Advisor Protocols in pie-chart format

6. Press **[F5]** to close the Protocols window.

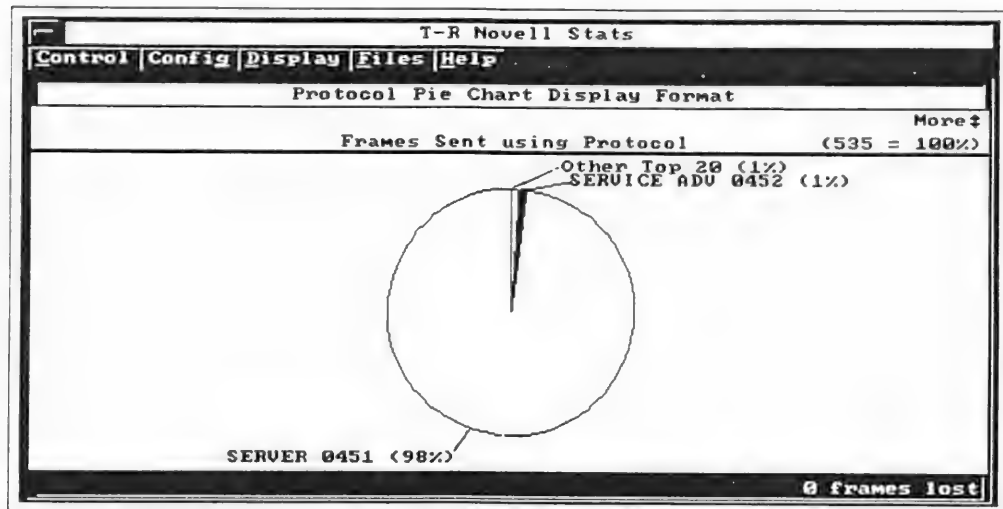
Review Novell -- Protocols

7. Position the mouse pointer over the Novell field in the Protocols category and double click. The T-R Novell Stats measurement runs.



Token-Ring Novell Stats

Token-Ring Novell Stats provide detailed information about all the Novell protocols observed on your network, including frame length distribution. This information can be displayed in bar-chart or pie-chart format. To display in pie-chart format, or to display frame length distribution, select **[Display | Display protocols in pie chart format]** from the menu bar.



Token-Ring Novell Stats pie-chart display

8. Press **[F5]** to close the T-R Novell Stats measurement.

Review Network Total -- Stations

9. On the Expert Advisor screen, the Network Total Stations count is 9. Position the mouse on the Network Total Stations count and double click. The Station Discovery measurement opens and displays all observed stations on the network.

Token-Ring Expert Advisor Station Discovery				
[Source] [Control] [Display] [Node/Station List] [Print] [Help]				
Observed Stations - Network Total				
Station	New address	Address	observed	Not observed
	Address	Layer	Type/ID	Comment/Name
ALLEGRO-882	88608C21C29D	Token-Ring	Micro/PC	Token Ring Labs
88608C21C29D	88608C21C29D	IPX	8801	Allegro's Client
CLASS_SERVER	88608C21C749	Token-Ring	File Serv	Token Ring Labs
88608C21C749	88608C21C749	IPX	8804	Novell Server-486
DANTE-882	88608C21C749	Token-Ring	Micro/PC	Token Ring Labs
88608C21C749	88608C21C749	IPX	8801	Dante's Client
new HP----	DEEDEC	Token-Ring		
HP-----DEEDEC		Token-Ring		

Run From Capture Buffer complete

Token-Ring Expert Advisor Station Discovery displaying total observed network stations

All the stations observed on the network are displayed. Friendly names are observed and displayed along with physical layer addresses and network layer addresses.

Refer to chapter 2 of this manual for detailed information about the Station Discovery measurement.

10. Press [F5] to close the Token-Ring Expert Advisor Station Discovery measurement.

If you position the mouse on an individual protocol stack Stations count and double click, the Station Discovery measurement will open and display information for any stations observed, along with a network layer address that matches the protocol stack selected.

Review Network Total -- Warnings

11. On the Expert Advisor screen, the Network Total Warnings count is 53. Position the mouse on the Network Total Warnings count and double click. The Network Total Warning Event Summary window opens, displaying all warnings the Commentator measurement observed. A description of the warning event is provided along with the total number of times that warning was observed.

Network Total Warning Event Summary		
Count	Prot	Description
?	(22) T-R:	Soft Error
?	(18) T-R:	Ring Purging
?	(4) MAC:	Code Violations exceeded the threshold.
?	(4) MAC:	Network Code Violations exceeded the threshold.
?	(2) NOV:	Slow File Transfer
?	(2) T-R:	Ring Resetting
?	(2) MAC:	Claim Tokens exceeded the threshold.
?	(2) MAC:	Bad FCS Count exceeded the threshold.
	(1) T-R:	Failed Insertion

Network Total Warning Event Summary

The summary window shows all the warning events observed, totaled by event. To get more detailed information about an event, position the mouse on the event and double click. Or, use the up or down arrow keys to highlight the event, and press enter.

12. Position the mouse on the **[Failed Insertion]** event and double click. The Warning Event Detail window opens and displays more detail about this event.

Warning Event Detail (T-R: Failed Insertion)			
Index	Prot	Description	
1.	T-R: Failed Insertion	[Warning] Mar 10 10:45:23.1903259	
		Station: 00608C21C749, CLASS_SERVER	
		Reason: Neighbor Notification Participation Failed	
		Frame Number: 2988	

Warning Event Detail window

Notice that this window provides more detailed information about the event. From this window, you can drill down to a decode of the specific frame in the capture buffer or drill down to the context-sensitive help text that explains a failed insertion. By positioning the mouse pointer over the description field "Failed Insertion" (mouse pointer changes to a question mark) and clicking once, the context-sensitive help text window will open and display information about the failed insertion and possible causes of those frames.

Help: T-R: Failed Insertion	
Topics	Previous Related Print
<p>The Failed Insertion message is considered a WARNING event. This event identifies that the station has failed the Insertion Process.</p>	
<p>What to Check</p>	
<p>This type of failure can be caused by several factors. The Failed Insertion tests are:</p>	
<ul style="list-style-type: none"> ■ Duplicate - The inserting station has detected another station on the local ring with the same address. This is determined during the Duplicate Address Check (Phase 2) of the Ring Insertion Process by receiving a Duplicate Address Test MAC frame with either (or both) the Address-Recognized (AR) or Frame-Copied (FC) bits set in the frame status field. ■ Neighbor Notification Failed - The station failed to participate in the neighbor notification process. ■ Request Initialization Failed - The station was unable to set the station parameters. 	

Context-sensitive Help text for Failed Insertion

13. Press [F5] to close the help text window. Position the mouse pointer over any other part of the detailed event and click once; a decode window opens and displays the frame that caused the warning event. Press [F4 | Z] to zoom the decode window. Notice that the MAC frame type is 07, which indicates a duplicate address test. This station could not enter the Token-Ring network because another station has the same address.

Token-Ring Detailed Decode		
Control	Config	Actions
Format	Other displays	Print
Help		
Frame: 2988 Time: Mar 01@10:45:05.1903259 Length: 22		
Field	Value	Description
Access Control:		
Frame Priority	000.-....	Non-Priority
Token Bit	...1-....	Frame
Monitor Bit	....-0...	Not Passed Monitor
Reservation	....-000	Not Reserved
Frame Control:		
Frame Type	00.-....	MAC Frame
Reserved	..00-....	Reserved
Control	....-0001	Express Buffered
MAC Destination Address	CLASS SERVER	Individual, Universal
MAC Source Address	CLASS SERVER	No source routing
Destination Class	0000-....	Ring Station
Source Class	....-0000	Ring Station
MAC Frame Type	07	Duplicate Address Test
Frame check sequence	A4-03-69-3A	
> Intermediate bit	....-..0.	Single Frame
> Error bit	....-...0	No Errors Detected
> AC bits		Not Recognized and Not Copied
> Data size	0	
Advisor Data File c:\user\class\comm.tr, limits 1 - 3565.		

Novell Stack Detailed Decode displaying the Failed Insertion frame

14. Press [F5] to close all open windows until the Expert Advisor is the only open window.

The Network Totals Warning window provides information about all the Warning events observed on the network. Selecting the Warnings by protocol stack opens the Warnings Event Summary for that specific protocol stack.

15. From the Expert Advisor window, position the mouse pointer on the Novell Warnings and double click. The Novell Level Warning Event Summary window opens and displays only Novell warning level events. By filtering the displayed data to show only the protocol stack selected, you can quickly identify problems in that protocol stack and take corrective action.

15. Press [F5] to close the Novell Warning Event Summary window.

Using the Expert Advisor to Troubleshoot a Network Problem

The Expert Advisor window provides information about the overall health of the network. After replaying the *comm.tr* data file and reviewing data presented in the Expert Advisor window and other drill down windows, you should have a thorough understanding of what is happening on your network.

The network under test (our *comm.tr* file) shows poor Network Health. Although utilization is low, only averaging 1 percent, the Network Health had a low rating of zero. This is because many of the frames on the network contain errors. The best method for correcting this problem is to start troubleshooting the most serious problem. In the Expert Advisor window, the Network Total Alerts field shows 17 alert events. All 17 are MAC Level events. Your troubleshooting approach should be to review the most serious problems, the alert events, to understand them, and finally to take corrective action to eliminate them from the network.

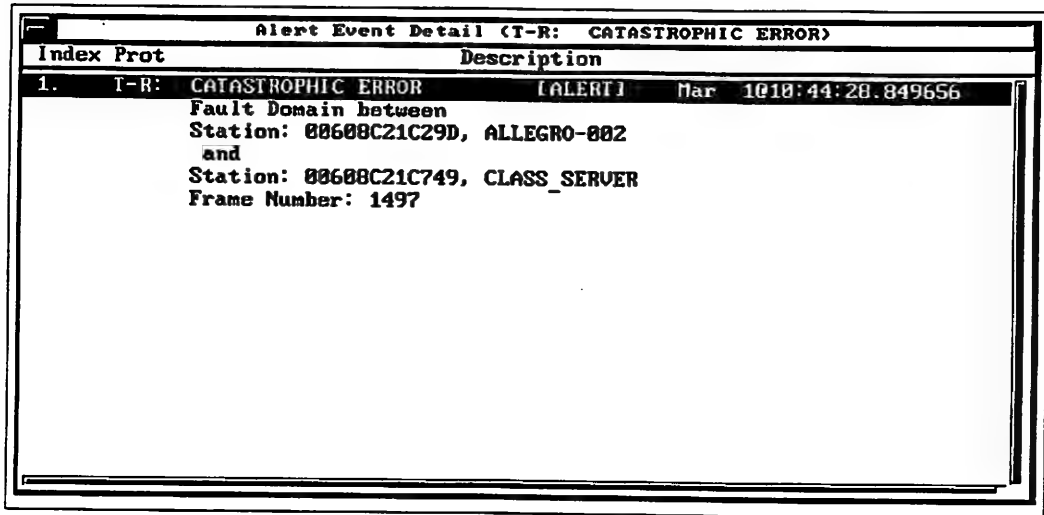
1. From the Expert Advisor window, position the mouse pointer on the Network Total Alerts field and double click.

Network Total Alert Event Summary		
Count	Prot	Description
?	(4) I-R:	Beacon
?	(4) MAC:	Ring Purges exceeded the threshold.
?	(3) I-R:	Streaming Beacons
?	(3) I-R:	Beaconing
?	(2) MAC:	Beacons exceeded the threshold.
	(1) I-R:	CATASTROPHIC ERROR

Network Total Alert Event Summary window

The summary window provides information about the 17 MAC Level events. Six problems have been identified. MAC, or physical layer problems should be investigated first. Their impact on network performance is far reaching. How can you understand these MAC layer problem and identify who or what is causing it?

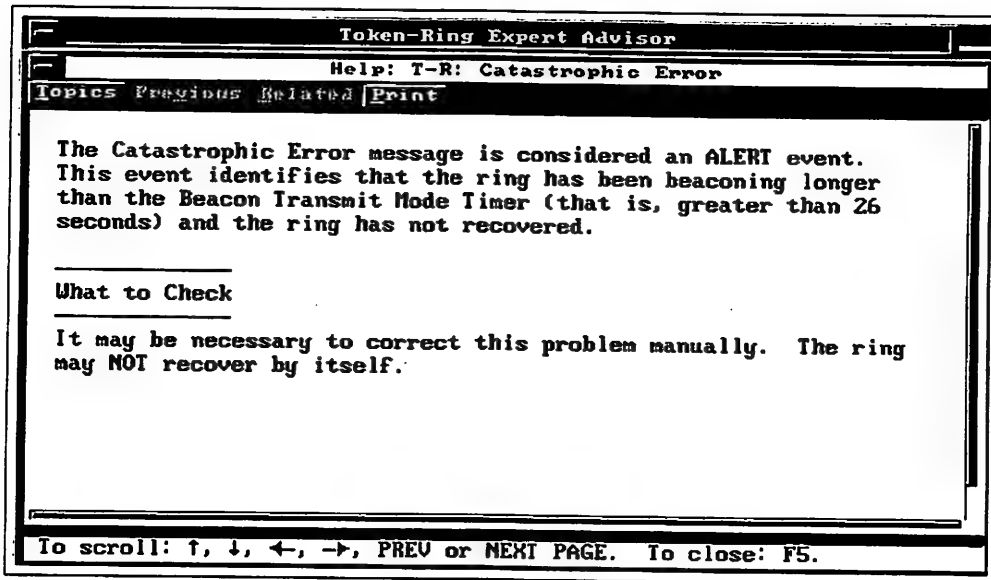
- Position the mouse pointer on the description line for the Catastrophic Error in the summary window and double click.



Alert Event Detail window displaying information about catastrophic error in more detail

Notice that the fault domain is between Allegro-002 and the Class_Server.

- Review the context-sensitive Help text to understand a catastrophic error. Position the mouse pointer on the catastrophic error description line, the mouse pointer will change to a "?". Click once.



Context-sensitive Help text for catastrophic error

4. Press [F5] to close the Help text window.

5. To investigate the problem in more detail, position the mouse pointer on the description line containing "Frame Number: 1497" and double click. frame 1497 is displayed. Press [F4 | Z] to zoom the window. The decode opened and displayed is the Token-Ring Detailed Decode, which displays data related to the MAC layer. Notice that the MAC frame type is 02, a Beacon frame, and the Subvector type is 0002 which indicates a signal loss error.

Token-Ring Detailed Decode		
Control | Config | Actions | Format | Other displays | Print | Help		
Frame: 1497 Time: Mar 81018:44:81.8496568 Length: 48		
Field	Value	Description
Access Control:		
Frame Priority	000.-....	Non-Priority
Token Bit	...1-....	Frame
Monitor Bit	....-0...	Not Passed Monitor
Reservation	....-.000	Not Reserved
Frame Control:		
Frame Type	00.-....	MAC Frame
Reserved	..00-....	Reserved
Control	....-0010	Express Buffered
MAC Destination Address	Broadcast	Broadcast
MAC Source Address	DANTE-002	No source routing
Destination Class	0000-....	Ring Station
Source Class	....-0000	Ring Station
MAC Frame Type	02	Beacon
Subvector Type	0002	Signal Loss Error
Subvector Type	00000000	Physical Location
Subvector Type	ALLEGRO-002	MAUN
Frame check sequence	6A-21-7B-32	
> Intermediate bit	....-..0.	Single Frame
> Error bit	....-...0	No Errors Detected
> AC bits		Not Recognized and Not Copied
> Data size	0	
Advisor Data File c:\user\class\comm.tr, limits 1 - 3565.		

Token-Ring Detailed Decode displaying frame 1497

The information provided in the Alert Events summary window and detail window, along with the frame from the capture buffer identifies a beacon condition, lasting longer than 26 seconds, caused by a physical layer problem, signal loss, between Allegro-002 and Class_Server. With this information you can investigate the physical connections, lobe, MAU, NIC, etc., between these two stations to isolate and resolve the problem.

6. Press [F5] to close each window until you return to the Expert Advisor window.

Configure the Expert Advisor

1. From the menu bar, select [Config | Configure Token-Ring Expert Advisor]. From the menu bar, select [Defaults | Restore default values].

Expert Advisor main configuration window

The Expert Advisor Configuration window lets you customize the Expert Advisor by configuring fields that control such parameters as:

- Information shown in the first column of the Token-Ring Expert Advisor window
- Number of Warnings and Alerts to be kept; whether to reset the high and low indicators in the Expert Advisor window
- Whether the Network Utilization graph is autoscaled within the network utilization range, or whether it stays scaled at 100 percent
- Whether Warning and Alert events are posted to the Internet Advisor's Event Log
- How Network Health is calculated
- Whether a user-defined threshold is displayed in the Network Health graph, and whether all running measurements are stopped if this threshold is exceeded

The Token-Ring Expert Advisor Configuration window also lets you configure parameters for Commentators, Vital Signs, and Station Discovery. Refer to chapter 2 for configuring Station Discovery, chapter 6 for Vital Signs configuration, and chapter 7 for configuration information on Commentators.

Protocol Statistics have no configurable parameters in the Expert Advisor. Context-sensitive help text is available in the configuration windows. From the Configuration window menu bar, select **[Help | Configuration topics]** to learn more about configuring individual fields within the configuration windows. Select **[Done | Exit]** from the help text menu bar to close the window.

Create Additional Copies of the Expert Advisor

You can create and save multiple Expert Advisor measurements, which allows you the flexibility to configure the Expert Advisor for certain networks or network conditions. You can use these different configurations when you want to use the Expert Advisor on a different network.

For example: If you have previously baselined your network, or network segments, you should have a good understanding of what threshold values to configure. You could create an Expert Advisor measurement for each network, or network segment, and configure each new Expert Advisor measurement with the appropriate threshold values. Then, when you want to monitor a network or segment, you can quickly start the pre-configured Expert Advisor measurement.

1. From the configuration window menu bar, select **[Create | Create new measurement]**. Enter any name and a comment field. For this example, use the name: **[Chapter 4 Expert Advisor]** and **[custom configuration]** for the comment field.

Create New Measurement

Done **Cancel**

Page 1 of 1

Name Chapter 4 Expert Advisor

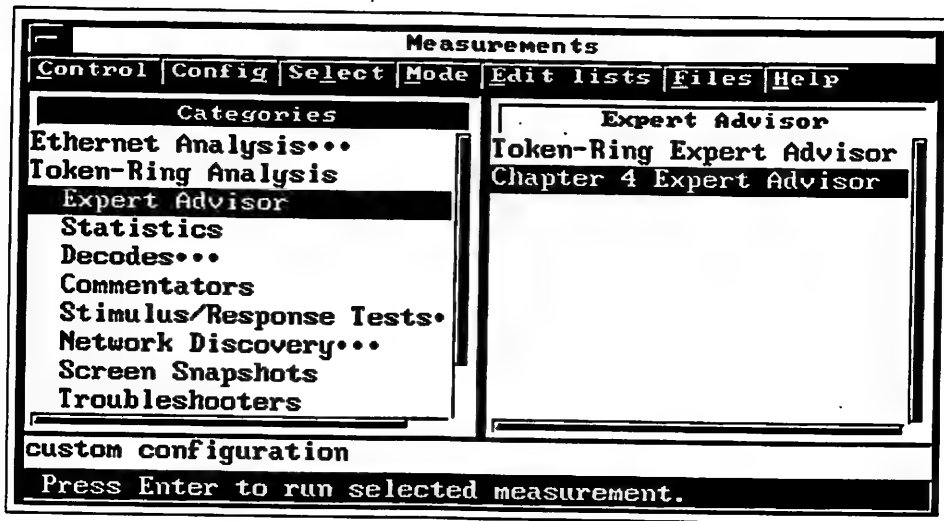
Comment custom configuration

Type your choice and press Enter.

Create New Measurement window within Configuration window

2. From the configuration window, select **[Done | Accept changes and exit]**. Then press **[F5]** to close the Expert Advisor window.

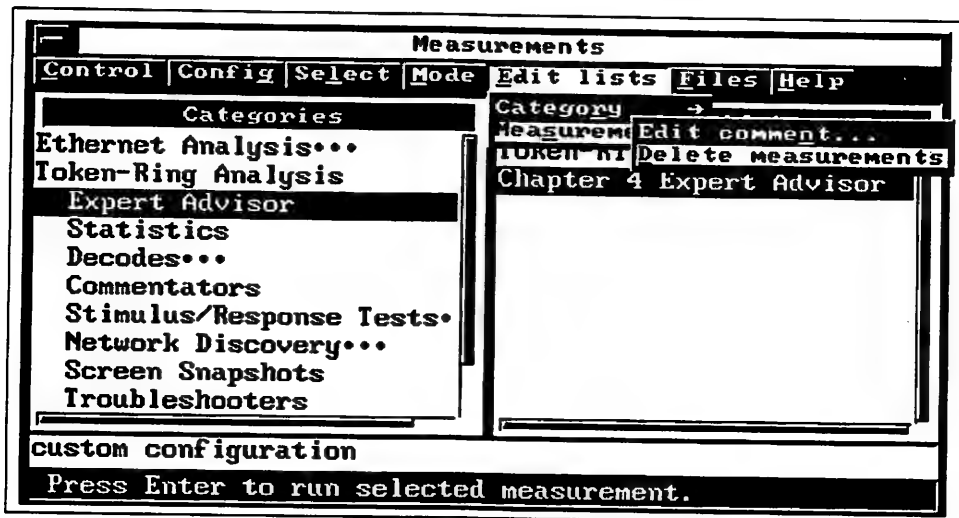
The Measurements window appears with the new "Chapter 4 Expert Advisor" measurement in the Expert Advisor category.



New Chapter 4 Expert Advisor measurement available in Measurements window

Chapter 4 Expert Advisor can be opened and configured to fit your particular testing needs, especially in the Network Health calculations.

4. To remove Chapter 4 Expert Advisor from the Measurements window, select [Chapter 4 Expert Advisor], then from the Measurements window menu bar select [Edit lists | Measurement | Delete measurements]. A warning message will appear indicating you are deleting a measurement. Check whether you are deleting the proper one, and select [yes] and press [Enter]. Chapter 4 Expert Advisor is removed from the Expert Advisor category.



Removing a measurement from the Measurements window

Chapter Notes

Chapter 5 - Statistics

Objective

Network management requires an in-depth understanding of network behavior, and to meet this requirement you need a comprehensive set of analysis tools. The Internet Advisor for Token-Ring has several powerful statistical measurements available to help you proactively manage and troubleshoot your network.

In this chapter you will learn about statistical measurements, how to configure them, and how to use them effectively.

Topics Covered

- Statistical Category overview
- Summary Statistics
- Station Statistics
- Protocol Statistics
- Connection Statistics
- Top Talkers
- Top Error Reporters

Preparation

- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.
- The Station List `c:\user\class\class.lst` should be loaded.
- The Advisor Data File `c:\user\class\stats.tr` must be loaded into the capture buffer.

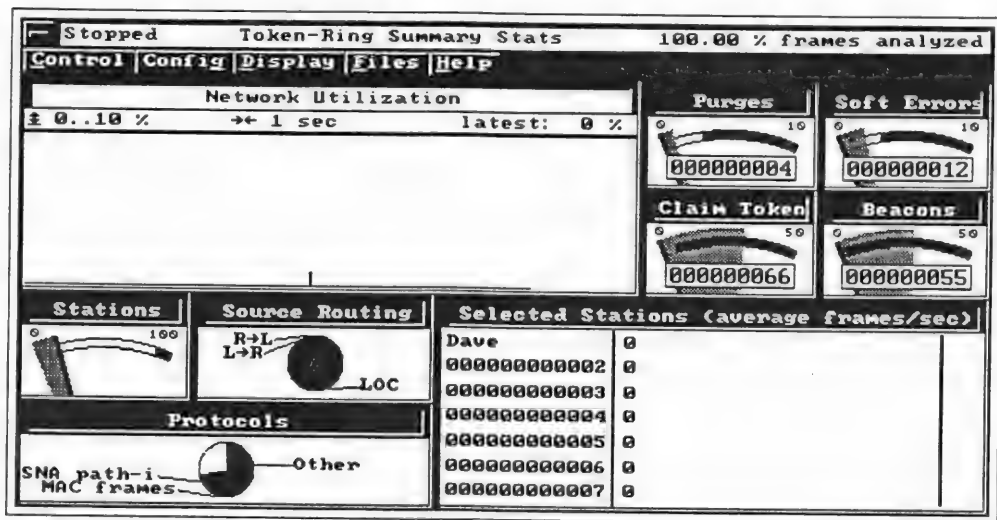
View the Statistics Categories

In the Measurements window, Statistics category, the following statistical measurements are available:

Token-Ring Statistics	Summary of the Measurement
Summary Stats	Provides a summary of the activity on an Token-Ring network, including network utilization, collisions, errors, Station count, bytes/frame, destination addresses, selected nodes, and protocols.
Station Stats	Displays statistical information for up to 20 stations. The following can be displayed for each Station: frames sent, frames received, bytes sent, bytes received, errors reported, all stations broadcasts, functional address frames, source route broadcasts, source route frames transmitted, or source route frames received.
Protocol Stats	Displays the types of protocols being used on your network. Frame length distribution by protocol is also available.
Connection Stats	Keeps track of conversation pairs by MAC address, or network address (IP, Novell IPX, DECnet, AppleTalk, Banyan or OSI). Using the Connection Statistics measurement, you can track errors and bandwidth utilization (by frames or by Kbytes) by connection pair, and display the results in either bar-chart or pie-chart format.
IP Subnet Connection Stats	Same as Connection Stats measurement except this measurement keeps track of conversation pairs by IP Subnet address.
Top Talkers	Displays a list of up to 50 stations that have generated the most frames since the measurement was started. The list includes the following information: station, frames transmitted, bytes transmitted, frames received, and bytes received.
Top Error Reporters	Displays a list of up to 50 stations that have generated the most error frames since the measurement was started, and includes the following information: station, total errors, and errors detected.
Token-Ring Vital Signs	Shows important information about a Token-Ring network's performance, such as the number of abort frames occur on the network, and what percentage of the network's capacity is being used (utilization). Vital Signs also indicates the presence of potentially serious errors on your network; and infers possible causes of the problems using a combination of errors in each frame.
Novell, TCP/IP, DECnet, AppleTalk, OSI, and Banyan Vital Signs	These measurements are covered in detail in chapter 6.

Run Summary Statistics

1. From the Measurements window, Statistics category, select **[Token-Ring Summary Stats]** and press **[Enter]**.
2. From the menu bar, select **[Config | Configure Selected Stations]**. Click on the Station 1 address field, or use the down arrow key until the Station 1 address field is highlighted. Tab to the Station List pane and type **[Dave]** for station Dave. Press **[Enter]** and Dave will be selected as the Station 1 address. From the menu bar select **[Done | Accept changes and exit]**.
3. From the Token-Ring Summary Stats menu bar, select **[Control | Run Measurement From Capture Buffer | All Frames]**.



Summary Stats window

Drill Down Capability

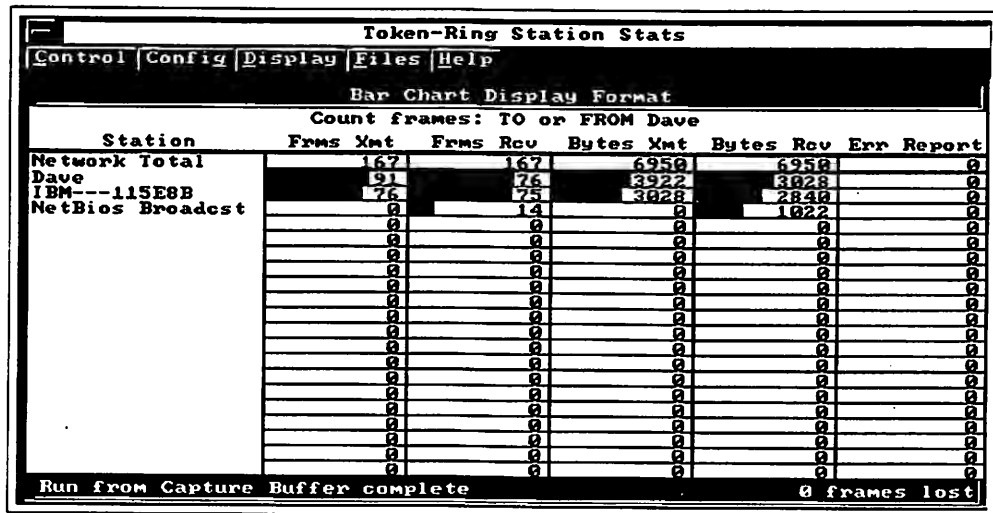
The Token-Ring Summary Stats drill down capability provides fast, easy access to all statistical measurements in the Internet Advisor. Starting from the Summary Stats window, other statistical measurements can be started simply by clicking on the area of interest in Summary Stats. For example, clicking on the Protocols pie chart in Summary Stats starts the Protocol Stats measurement, or clicking on the Purges gauge starts Top Error Reporters.

The following table lists the statistical measurements you start by clicking on selected fields in the Summary Stats window:

Summary Stats Screen Field	Measurement Started
Network Utilization	Starts Token-Ring Top Talkers -- identifies the top talkers, so you can see who is contributing the most to the network utilization.
Purges, Soft Errors, Claim Token, or Beacons	Starts Token-Ring Top Error Reporters -- provides additional information as to the type of errors occurring on the network and who is reporting them.
Stations	Starts Station Discovery -- displays all observed stations.
Source Routing	Starts Token-Ring Source Routed Stations -- displays statistical information for up to 20 stations. Remote stations are shown in red.
Protocols	Starts Token-Ring Protocol Stats configured to show SAPs and Types for all protocols seen on the network.
Selected Stations	Clicking on any one of seven stations will start Token-Ring Station Stats, configured to display only frames seen to or from the selected station. Configure selected stations with your top seven servers or stations. This allows you to quickly see who is accessing your those servers or stations.

Note: If you are running Summary Stats from buffer, as in this example, measurements started from Summary Stats will also run from buffer. If you were to run Summary Stats from the network, then the other measurements started from Summary Stats would also run from the network. Additional information about each of the statistical measurements started from Summary Stats can be found later in this chapter. You can use the drill down function to start these measurements, or you can run the measurements individually.

4. Position your mouse on Dave (the mouse pointer will change from a pointer to a magnifying glass) from the Selected Stations field of the Summary Stats window and double click. Token-Ring Station Stats automatically starts, configured to display only stations to which Dave is sending frames or from which he is receiving frames.



Station Stats -- traffic to or from Dave displayed

5. Press **[F5]** to close the Station Stats measurement.

Note: Configure Summary Stats selected stations to include your top servers or stations. When a problem arises with one of those server or stations, you can quickly drill down and view traffic to or from it.

Display Summary Stats in Graphical Format

- From the menu bar, select **[Display | Display trends in graphical format]**.
- From the menu bar, select **[Config | Configure Trends]**. In the "Graph shows:" configuration field, select **[user defined]**. Then in the line 1, line 2, line 3, and line 4 fields, select **[Utiliz. fr]**, **[Claim token fr]**, **[Beacon frames]**, and **[Purge frames]**, respectively from the list pane that appears when you select each field.

Configure For: Trends	
<div>Done Cancel Defaults Create Help</div> <div>Page 1 of 1</div>	
Graph shows:	<user defined>
line 1	Utiliz. fr
line 2	Claim token fr
line 3	Beacon frames
line 4	Purge frames
1 second samples	<input type="checkbox"/>
10 second samples	<input type="checkbox"/>
1 minute samples	<input type="checkbox"/>
10 minute samples	<input type="checkbox"/>
60 minute samples	<input type="checkbox"/>

Graph shows:

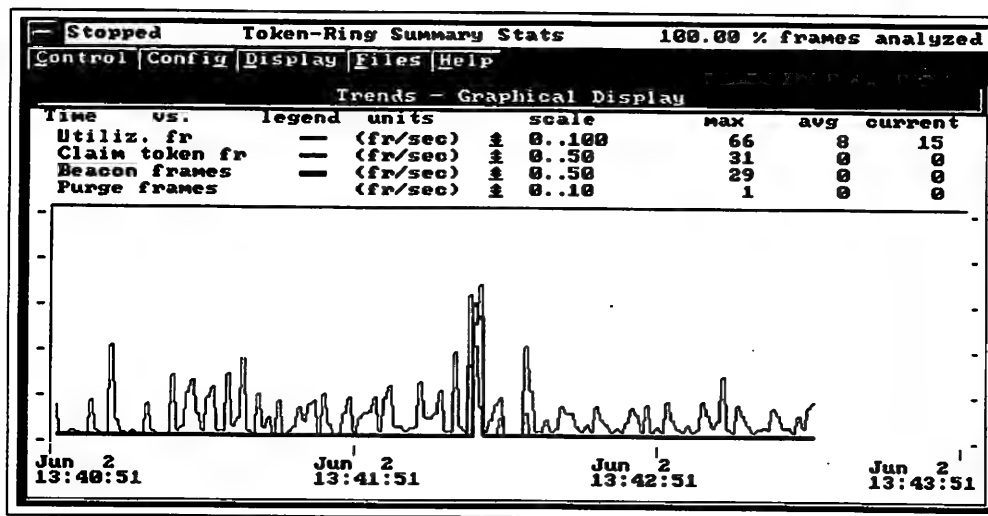
Isolating err count 1
 Isolating err count 2
 Non-isolating errs 1
 Non-isolating errs 2
 First station
 First protocol
 Routing history
 <user defined>

Type one of the choices shown in the list pane.
Or press F3, highlight an item, and press Enter.

Summary Stats -- Trends configuration window

8. From the menu bar, select [Done | Accept changes and exit]. Select [Control | Run Measurement From Capture Buffer | All Frames]. The display now shows a graph over time of the network utilization, claim token frames, beacon frames, and purge frames. The network observations are peaking at:

66 utilization frames per second
 31 claim token frames per second
 29 beacon frames per second
 1 purge frame per second



Summary Statistics -- graphical display

Store Files Containing Statistics Data

You can save information to a comma separated variable (csv) file, and then load data from that file into the HP Internet Reporter or into a spreadsheet application such as Microsoft Excel, for further analysis.

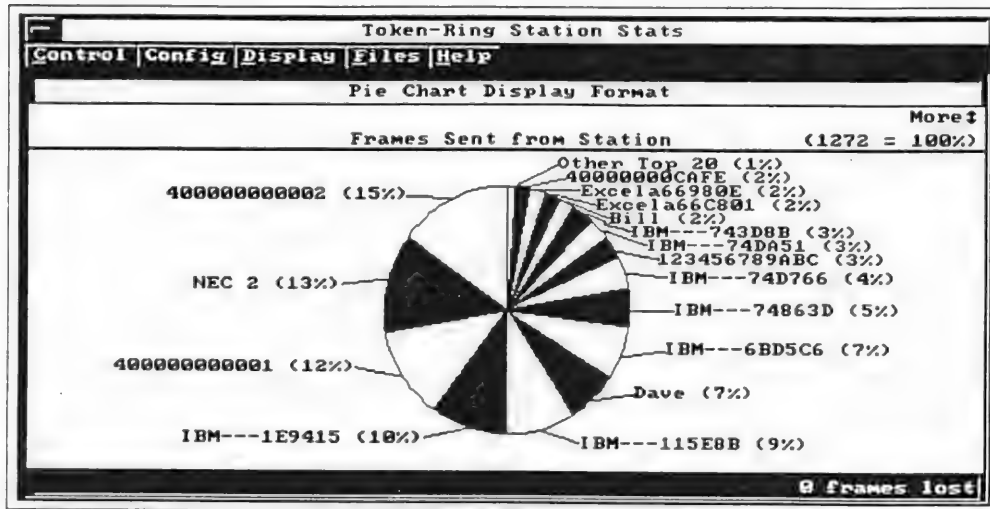
1. From the menu bar, select **[Files | Write samples from previous run to ASCII file]** or **[Files | Log samples to ASCII file during next run]**. The File Manager window will appear.

Note: Writing samples from previous run to ASCII file will write the last 180 sample periods to disk. If you have a 1 second sample period selected, then the previous 3 minutes of statistical data will be written to disk. Logging to disk will track statistical data over time. If you log 1 second samples to disk, don't store more than 2 hours of data. Two hours of 1 second samples yields a csv file of 7,200 rows.

2. Enter a new file name in the File name: field, and use a ".csv" extension. When saving a file:
 - a. You can save this file in the currently selected directory (user\stats).
 - b. Using the File commands menu bar item, you can create a new subdirectory.
 - c. Using the Drive menu bar item, you can save the file to the floppy disk drive (a:).
3. When you are finished naming the file, select **[Done | Accept selection and exit]**.
4. Press **[F5]** to close the Summary Stats window.

Run Station Stats

1. From the Measurements window, Statistics category, select [Token-Ring Station Stats] and press [Enter]. From the menu bar, select [Control | Run Measurement From Capture Buffer | All Frames]. From the menu bar, select [Display | Display in pie chart format].



Station Stats - pie-chart display

The Token-Ring Station Stats measurement, in pie-chart format, shows statistical information for up to 20 stations. You can display five different pie charts, depending on the selections you make in the Station Stats Configuration window.

In each pie chart, stations are identified by their hex MAC addresses, station names, or their vendor names, depending on the format selected in the Token-Ring Station Stats configuration window. For each pie chart, if a station contributes less than 2 percent of the traffic, its percentage is not shown individually. Rather, that station's percentage is shown in the "Other Top 20" section of the pie chart. The "All Other" section indicates the percentage contributed by stations that are not in the top 20.

2. Press the **[Next Page/Prev Page]**, or **[PgUp/PgDn]** keys as a shortcut to toggle through the graphs. In the pie-chart or bar-chart format, you can configure statistics to display any five of these charts:

- **Frames Sent** — shows the percent of frames sent from each of the top 20 stations.
- **Frames Received** — shows the percent of frames received at each station.
- **Bytes Sent** — shows the percent of bytes sent by each station.
- **Bytes Received** — shows the percent of bytes received at each station.
- **Errors Reported** -- shows the percentage of errors reported by each station.
- **All Stations Broadcast** -- shows the percent of broadcast frames sent by each station.
- **Functional Address Frames** -- displays percent of frames sent to a functional address by each station.
- **Source Route Broadcasts** -- displays the percent of source routed broadcast frames sent by each station.
- **Source Route Frames Transmitted** -- displays the percent of source route frames sent by each station.
- **Source Route Frames Received** -- displays the percent of source route frames received by each station.

3. From the menu bar, select **[Config | Configure Token-Ring Station Stats]** and explore the capability to sort on a display according to user-specified needs. After reviewing the configuration options, select **[Done | Accept changes and exit]** from the menu bar.

4. Press **[F5]** to close the Station Stats measurement.

Run Protocol Stats

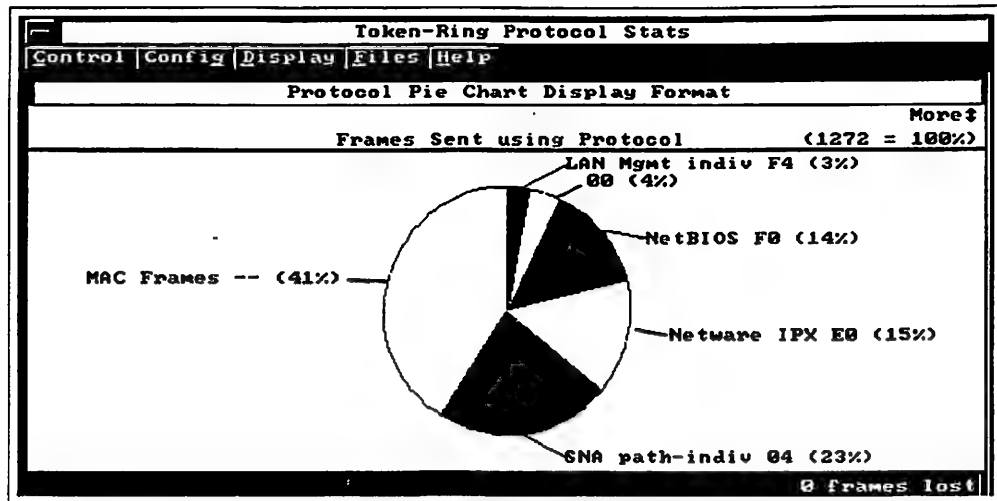
1. From the Measurements window, Statistics category, select **[Token-Ring Protocol Stats]** press **[Enter]**.
2. From the menu bar, select **[Config | Configure Token-Ring Protocol Stats]**. From the menu bar, select **[Defaults | Restore default values]**. From the menu bar, select **[Done | Accept changes and exit]**.

Configure For: Token-Ring Protocol Stats	
<div>Done | Cancel | Defaults | Create | Run | Page | Format | Help</div>	
Page 1 of 3	
Show statistics for	Data Link Layer
Display update interval	10 Seconds
Sort on and display	Frames
also display	Bytes
also display	DLL Errors
also display	Avg Frame Length
Count frames: ALL frames	<input type="checkbox"/>
TO <node>	<input type="checkbox"/>
FROM <node>	<input type="checkbox"/>
TO or FROM <node>	<input type="checkbox"/>
<node>	000000000001
Errored frame filter	Off
More ↓	
Type one of the choices shown in the list pane. Or press F3, highlight an item, and press Enter.	

Show statistics for
 Data Link Layer
 AppleTalk Stack
 Banyan (VINES) Stack
 DECnet Stack
 IP (ARPA) Stack
 Novell Stack
 OSI Stack

Protocol Stats configuration window.

3. From the menu bar, select **[Control | Run Measurement From Capture Buffer | All Frames]** to review information on the protocols running on your network.
4. From the menu bar, select **[Display | Display protocols in pie chart format]**. Use the **[Next Page/Prev Page]** or **[PgDn/PgUp]** keys to toggle through additional data.



Protocol Stats displayed in pie-chart format

5. From the menu bar, select [Display | Display frame lengths in bar chart format] to review frame length distribution by protocol. You can also toggle between screens in this display.

Token-Ring Protocol Stats
Control | Config | Display | Files | Help

Frame Length Bar Chart Display Format

Frames of Length:	Total	MAC Frames --
All Frame Lengths	1272	518
< 64 bytes	1014	518
64...127 bytes	252	8
128...255 bytes	6	0
256...511 bytes	0	0
512...1023 bytes	0	0
1024...2047 bytes	0	0
2048...4095 bytes	0	0
4096...8191 bytes	0	0
8192...16383 bytes	0	0
> 16383 bytes	0	0

0 frames lost

Frame Length Distribution in bar-chart format.

6. The Files selection can be used to save protocol and frame length data to a csv file. That file then can be imported into the HP Internet Reporter or into a spreadsheet application such as Microsoft Excel.

7. Press [F5] to close Protocol Stats.

Run Connection Stats

1. From the Measurements window, Statistics category, select [Token-Ring Connection Stats] and press [Enter].
2. From the menu bar, select [Config | Configure Token-Ring Connection Stats]. From the menu bar, select [Defaults | Restore default values].

Configure For: Token-Ring Connection Stats	
<div> <div>Done | Cancel | Defaults | Create | Run | Page | Format | Help</div> <div>Page 1 of 2</div> <div> <div>Show statistics for</div> <div> <div>Enable Subnet Stats:</div> <div> <input type="checkbox"/> </div> </div> <div> <div>Display update interval</div> <div>10 Seconds</div> </div> <div> <div>Sort on and display</div> <div>Frames</div> </div> <div> <div>also display</div> <div>Bytes</div> </div> <div> <div>also display</div> <div>Errors</div> </div> <div> <div>also display</div> <div><no selection></div> </div> <div> <div>also display</div> <div><no selection></div> </div> <div> <div>Count frames: ALL frames</div> <div> <input type="checkbox"/> </div> <div> <div>TO <node</div> <div> <input type="checkbox"/> </div> </div> <div> <div>FROM <node</div> <div> <input type="checkbox"/> </div> </div> <div> <div>TO or FROM <node</div> <div> <input type="checkbox"/> </div> </div> <div> <div><node></div> <div>FFFFFFFFFFFF</div> </div> <div> <div>Errored frame filter</div> <div>OFF</div> </div> <div>More ↓</div> </div> <div> <div>Show statistics for</div> <div> <div>Data Link Layer</div> <div>AppleTalk Stack</div> <div>Banyan (VINES) Stack</div> <div>DECnet Stack</div> <div>IP (ARPA) Stack</div> <div>Novell Stack</div> <div>OSI Stack</div> </div> </div> </div> <div> <div>Type one of the choices shown in the list pane.</div> <div>Or press F3, highlight an item, and press Enter.</div> </div> </div>	

Connection Stats - configuration window - default values displayed

3. Select [Done | Accept changes and exit] from the menu bar.
4. From the menu bar, select [Control | Run Measurement From Capture Buffer | All Frames].

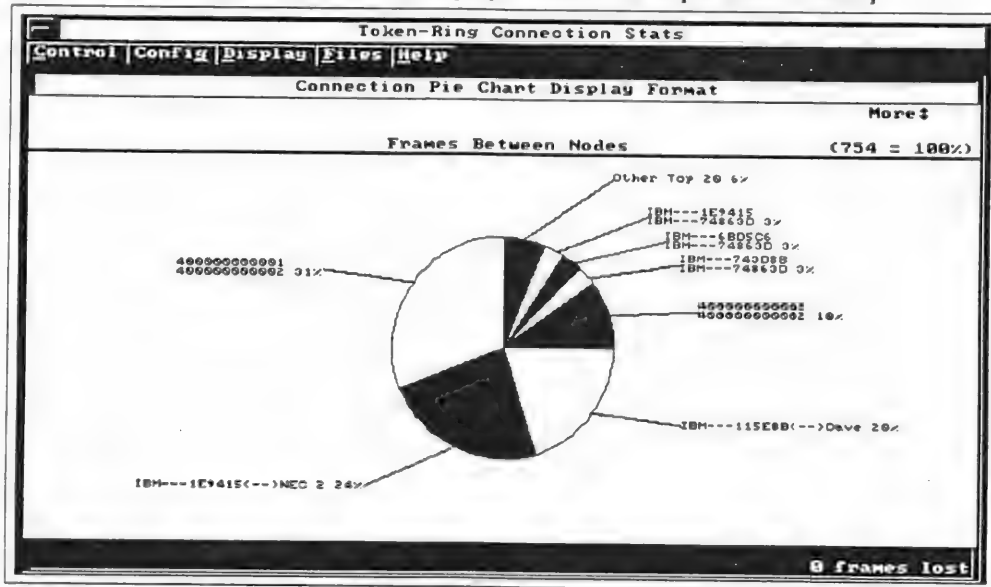
Token-Ring Connection Stats				
Control | Config | Display | Files | Help				
Connection Bar Chart Display Format				
Stn 1 MAC Name/Addr.	Stn 2 MAC Name/Addr.	Frames	Bytes	Errors
Network Total		754	42889	3
400000000001	400000000002	234	9615	0
IBM---1E9415	NEC 2	178	16417	1
IBM---115E8B	Dave	153	5928	2
400000000002	400000000002	78	5772	0
IBM---743D8B	IBM---74863D	20	500	0
IBM---6BD5C6	IBM---74863D	20	500	0
IBM---1E9415	IBM---74863D	20	500	0
IBM---115E8B	NetBios Broadcast	14	938	0
Dave	NetBios Broadcast	14	1022	0
IBM---1E9415	Novell Broadcast	5	473	0
Bill	FFFFFFFFFFFF	5	473	0
IBM---1E9415	Bill	4	228	0
NetGenE004DB	Lan Manager	3	237	0
IBM---74863D	IBM---74D90F	2	58	0
NetGenE00066	Lan Manager	2	170	0
IBM---6B8D0F	IBM---74863D	2	58	0
		0	0	0
		0	0	0
		0	0	0
		0	0	0

Run from Capture Buffer complete 0 frames lost

Connection Stats – MAC level conversations displayed

In the example above, MAC layer conversations are displayed. Total frames, bytes and errors are displayed. This information can also be viewed in percentages.

- From the menu bar, select [Display | Display connections in pie chart format].



Connection Stats – pie-chart format

Use the down arrow key to toggle between all the pie charts available.

6. Select **[Config | Configure Token-Ring Connection Stats]**. In the "Show statistics for" configuration field select **[Novell Stack]**. From the menu bar, select **[Done | Accept changes and exit]**.
7. From the menu bar, select **[Display | Display connections in bar chart format]**, then select **[Control | Run Measurement From Capture Buffer | All Frames]**.

```

Token-Ring Connection Stats
Control Config Display Files Help
Connection Bar Chart Display Format

Stn 1 IPX Name/Addr. Stn 2 IPX Name/Addr. Frames Bytes Errors
Network Total 192 17591 1
00000077-02608C0FF563 00000777-10005A3A4B4F 178 16417 1
00000777-10005A1E9415 00000777-FFFFFFFFFFFF 5 473 0
00000777-10005A74DBF1 00000777-FFFFFFFFFFFF 5 473 0
00000001-000000000001 00000077-02608C0FF563 4 228 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
Run from Capture Buffer complete 0 frames lost

```

Connection Stats – Novell connections displayed

8. Press **[F5]** to close the Connection Stats measurement.

Note: IP Subnet Connection Stats is available from the Statistics category too. This measurement is identical to Connection Stats, however, connections between IP subnets are displayed. Subnet addresses and subnet masks can be configured in the configuration window for IP Connection Stats.

Run Top Talkers

The Token-Ring Top Talkers measurement displays a list of up to 50 stations that have generated the most frames since the measurement was started.

1. From the Measurements window, Statistics category, select **[Token-Ring Top Talkers]** and press **[Enter]**. From the menu bar, select **[Config | Configure measurement]**. Set the Update Interval to **[10]** and the Errored frame filter to **[Off]**. From the menu bar, select **[Format | Display addresses by node/station name]**, then select **[Done | Accept changes and exit]**.
2. From the Token-Ring Top Talkers menu bar, select **[Control | Run Measurement From Capture Buffer | All Frames]**.

Token-Ring Top Talkers				
Control Config Print Help				
Station	Frames Xmt	Bytes Xmt	Frames Rcv	Bytes Rcv
400000000002	212	11246	200	11057
NEC 2	169	8591	92	11034
400000000001	154	6269	100	4418
IBM---1E9415	129	12621	100	5764
IBM---115E8B	115	4882	75	2840
Dave	91	3922	76	3028
IBM---6BD5C6	90	3090	12	342
IBM---74863D	58	1710	34	904
IBM---74D766	45	1688	2	92
123456789ABC	36	1400	0	0
IBM---74DA51	33	1242	8	208
IBM---743D8B	33	1078	10	250
Bill	30	1415	2	114
Excelsa66C801	24	864	0	0
Excelsa66980E	23	828	0	0
4000000000CAFE	23	828	0	0
NetGenE004DB	3	237	0	0
NetGenE00066	2	170	0	0
IBM---74D98F	1	31	1	27
IBM---6B8D0F	1	31	1	27
Van Manager	0	0	0	0
Stopped, Analyzer Data File.				

Top Talkers window

Top Talkers displays the following information about the top 50 stations:

- **Station**—shows either the hex MAC address, station name, or vendor name of each station, depending on the format selected in the Top Talkers configuration window.
- **Frames Xmt**—shows the number of frames each station sent.
- **Bytes Xmt**—shows the number of bytes each station sent.
- **Frames Rcv**—shows the number of frames sent to each station.
- **Bytes Rcv**—shows the number of bytes sent to each station.

3. Press **[F5]** to close Top Talkers.

Note: Top Talkers can be printed to a file and imported into the HP Internet Reporter.

Run Top Error Reporters

1. From the Measurements window, Statistics category, select [T-R Top Error Reporters] and press [Enter]. From the menu bar, select [Config | Configure measurement]. Set the Update Interval to [10]. From the menu bar, select [Format | Display addresses by node/station name], then from the menu bar, select [Done | Accept changes and exit].
2. From the menu bar, select [Control | Run Measurement From Capture Buffer | All Frames].

T-R Top Error Reporters		
Control | Config | Print | Help		
Station	Total Errors	Errors Detected
IBM---6BD5C6	53	Claim
NEC 2	51	Beacon
		Burst Error
		Claim Error
IBM---74D766	13	Burst Error
		Claim Error
		Ring Purge
		Token Error
123456789ABC	13	Beacon
		Receiver Congestion
IBM---74DA51	5	Claim
		Ring Purge
IBM---115E8B	1	Burst Error
Excelsa66C801	1	Claim
Stopped, Analyzer Data File.		

Top Error Reporters window

2. Press [F5] to close the Top Error Reporters measurement.

Chapter Notes

Chapter Notes

Chapter 6 - Vital Signs

Objective

Isolating a LAN problem or tuning a network can often mean searching through thousands of captured frames, most of which are insignificant or irrelevant. Using the Vital Signs measurements in the HP Internet Advisor for Token-Ring will increase your productivity and save you time by automating the processing of this information and helping you determine what is important and what is not.

Vital Signs provide a statistical picture of the Token-Ring MAC layer, Novell, TCP/IP, AppleTalk, Banyan, DECnet, and OSI protocol stacks. Vital Signs can be used to identify problems or assist in optimizing the configuration of network components and software to get the most out of your network. Current, average, peak, and total sample values are shown for each statistical parameter, along with user-configurable thresholds that can be set dynamically to automatically detect intermittently occurring events.

When a threshold is exceeded, it can be recorded in the Event Log and can be used to stop the capture process so that events leading up to the problem can be analyzed when convenient for you. Vital Signs are the first step in an expert process which also uses Commentators and specific frames stored in the capture buffer to detect and resolve your networking problems.

The Vital Signs operate in real time, interpreting data traffic as it occurs. The thresholds in Vital Signs automatically stops all measurements from running when configured for specific significant events that occur, allowing you time to analyze the problem.

In this chapter, you will learn to configure and use the Vital Sign measurements and decodes to become more productive at troubleshooting and managing your network.

Topics Covered

- Configuration of the thresholds and trigger actions
- Examining the capture buffer after a Vital Sign measurement stops
- Using detailed and summary decodes to analyze errored frames
- Using Novell Vital Signs
- Using decodes to analyze specific Novell frames
- Using DECnet Vital Signs
- Help Text for Vital Signs

Preparation

- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.
- The Station List `c:\user\class\class.lst` should be loaded.
- The Advisor Data File `c:\user\class\vit.tr` should be loaded into the capture buffer.

Vital Sign Measurements

Vital Sign measurements display performance statistics and are available for Token-Ring, TCP/IP, Novell, DECnet, AppleTalk, OSI, and Banyan. You see exactly what kinds of traffic are present, and their performance percentages. Data is simultaneously captured in the capture buffer as the various Vital Sign measurements are executed.

The unique interaction between Vital Signs and packet capture is that the Vital Signs window is driven by the frames arriving into the capture buffer.

- Using the Vital Signs configuration menus, you can set thresholds to insert performance events into the Event Log.
- You can also set a threshold which, when exceeded, stops all measurements. Typically you may choose to use a decode to examine frames that caused this event, or replay data through statistical measurements to document the network's behavior just before the threshold was exceeded.

Run Token-Ring Vital Signs

1. From the Measurements window, Statistics category, select [Token-Ring Vital Signs] and press [Enter]. From the menu bar, select [Control | Run Measurement From Capture Buffer | All Frames].

Token-Ring Vital Signs					
Control | Config | Print | Help					
Token-Ring Vital Signs					
	Threshold	Current	Average	Peak	Total
NETWORK COUNTS (Pre-Filter)					
Utilization %	30	0.00	1.07	5.48	
Frames	1000	1	52	220	1582
Bad FCS	0	0	3	23	110
Code Violations	10	0	0	2	3
Aborts	10	0	0	0	0
Tokens	1300000	0	0	0	0
BUFFER COUNTS (Post-Filter)					
Utilization %	30	0.00	1.07	5.48	
Frames	1000	1	52	220	1582
Code Violations	10	0	0	2	3
Aborts	10	0	0	0	0
Rev Congestion	0	0	0	0	0
Burst Errors	10	1	0	2	8
Line Errors	10	0	0	1	3
Soft Errors	10	1	0	2	11
Beacons	10	0	0	24	24
Claim Tokens	10	0	2	31	61
Ring Purges	10	0	0	2	6
Missed frames	100	0	0	0	0
Start Time: Mar 1 95 @ 11:07:25					
Sample Time: Mar 1 95 @ 11:08:17					
Stopped, Analyzer Data File.					

Token-Ring Vital Signs window

Notice in the Token-Ring Vital Signs results that several types of Token-Ring media access control events are present. You would expect to see soft errors as stations leave and re-enter the Token-Ring network. In this example we observed several ring operation problems, a large number of Ring Purges, Claim Tokens, Line Errors, and Beacon frames. When the thresholds are exceeded, the results may be displayed in orange or red, depending on whether a threshold and/or a trigger has been set, within the current column.

Exceeded thresholds are also recorded by the Event Log. The Token-Ring Vital Signs configuration screen allows you to specify threshold values, and when the threshold value is exceeded the Event Log will record the excessive "peak" value and the time that the threshold was exceeded.

- From the menu bar, select **[Config | Configure measurement]**. Configure the utilization percentage threshold to **[5]** and place a check mark in the Log threshold events field. From the menu bar, select **[Done | Accept changes and exit]**.

Configure For: Token-Ring Vital Signs	
Done Cancel Defaults Create Run Page Help	
Page 1 of 5	
Log threshold events	<input checked="" type="checkbox"/>
Utilization % Threshold	5
Stop on Threshold	<input type="checkbox"/>
Frames Threshold	1000
Stop on Threshold	<input type="checkbox"/>
Bad FCS Threshold	0
Stop on Threshold	<input type="checkbox"/>
More >	
Press Enter to enable (checkmark) or disable.	

Token-Ring Vital Signs configuration window

- Press **[F7]** to open the Event Log, then select **[Browse | Browse All Events]** from the menu bar. Iconize the Event Log by clicking on it, then press **[F4 | I]**. Position the All Events Browser and the Token-Ring Vital Signs as in the following example. With the Window Control **[F4]** you can select to move and size the active window.

Refer to the *HP LAN Advisor Family Quick Start/User's Guide* (part. no. 5963-2720) for more information on managing the Internet Advisor's windows.

	Threshold	Current	Average	Peak	Total	ary Stats
NETWORK COUNTS (Pre-Filter)						
Utilization %	5	0.00	1.07	5.48		ion Stats
Frames	1000	1	52	220	1582	ocol Stats
Bad FCS	0	0	3	23	110	Talkers
Code Violations	10	0	0	2	3	eporters
Aborts	10	0	0	0	0	l Signs
Tokens	1300000	0	0	0	0	gns
BUFFER COUNTS (Post-Filter)						
Utilization %	30	0.00	1.07	5.48		gns
Frames	1000	1	52	220	1582	gns
Code Violations	10	0	0	2	3	
Aborts	10	0	0	0	0	
Rev Congestion	10	0	0	0	0	
Burst Errors	10	1	0	2	8	
Line Errors	10	0	0	1	3	
Soft Errors	10	1	0	2	11	
Beacons	10	0	0	24	24	
Claim Tokens	10	0	2	31	61	
Ring Purges	10	0	0	2	6	
All Events Browser						
Date	Time	Type	Description			
W 02/22/95	12:08:57.88	Thrsh	Network Utilization exceeded the threshold.			
W 02/22/95	12:09:00.02	Thrsh	Bad FCS Count exceeded the threshold. 17 fr/s			
W 02/22/95	12:09:00.85	Thrsh	Claim Tokens exceeded the threshold. 31 /s.			
W 02/22/95	12:09:01.50	Thrsh	Beacons exceeded the threshold. 24 /s. Fram			

Token-Ring Vital Signs with All Events Browser

The events that exceeded the threshold in the previous screen provided entries into the Event Log.

The **Log threshold events** selection on the configuration page of the Vital Signs measurement inserts entries into the Event Log. Threshold values can be specified for the particular network environment. The **Stop on Threshold** selection does one of the following:

If unselected, the Internet Advisor continues to monitor the network and posts Vital Signs statistics until you manually stop the measurement.

If selected, the Internet Advisor stops the measurement when the threshold is exceeded, preserving the data capture buffer to allow you to analyze frames with a decode or replay the buffer through other statistical measurements.

- Press [F5] to close the Vital Signs, and press [F5] to close the All Events Browser.
- From the Measurements window, Decodes category, press [Enter] to expand the Decode category until you see the Token-Ring/LLC category. From the Token-Ring/LLC category, select [Token-Ring Decode] and press [Enter].

7. From the Token-Ring Detailed Decode window, select [**Other display | Open Summary Decode window**]. From the menu bar, select [**Actions | Go to Frame | Frame # 589**]. Size and position your window as in the following example:

Token-Ring Summary Decode						
Control | Config | Actions | Format | Other displays | Print | Help						
Frame	Time	Source	Destination	Frame Type	MAC Frame	
!589	08:06.667	IBM---78D2B6	IBM---7DD6CF	LLC Frame		
590	08:06.672	IBM---78D2B6	IBM---7DD6CF	LLC Frame		
591	08:06.677	IBM---7DD6CF	IBM---78D2B6	LLC Frame		
592	08:06.682	IBM---7DD6CF	IBM---78D2B6	LLC Frame		

Token-Ring Detailed Decode						
Control | Config | Actions | Format | Other displays | Print | Help						
! Frame: 589 Time: Mar 01@11:08:06.6675695 Length: 38						
Field	Value	Description				
Broadcast Indicator	000-....	Non Broadcast				
Route Field Length	...0-1000	Bytes of Source Routing				
Direction Bit	1...-....	Read Right To Left				
Largest Frame	.011-....	As many as 4472 bytes				
Ring Number	0001					
Bridge Number	03					
Ring Number	0002					
Bridge Number	02					
Ring Number	0003					
Bridge Number	00					
Frame check sequence	BA-D1-1B-AD					
> Intermediate bit	....-..0.	Single Frame				
> Error bit	....-..0	No Errors Detected				
> AC bits		Not Recognized and Not Copied				
> Bad FCS						
> Data size	4					

Advisor Data File c:\user\class\tr\it.tr, limits 1 - 1582.

Token-Ring Detail and Summary Decode windows.

In the previous example, you started running Vital Signs, and because the Internet Advisor can simultaneously capture data and post results to the Token-Ring Vital Signs window, you chose to stop the Vital Signs measurement and review data in the capture buffer.

Using two decode windows, the Token-Ring Summary Decode window displays errored frames in the left-hand column by marking those frames with “!” (for example frame 589).

The bottom Token-Ring Detailed Decode window displays the errors in frame 589 in two ways: first by marking it with “!”, second, at the bottom of the display, important information about the frame is clearly shown: Not recognized and Not copied “an orphan frame”, and has a bad FCS value.

8. When you are finished, press [**F5**] to close the decode windows.

Run Novell Vital Signs

1. From the Measurements window, Statistics category, select [Novell Vital Signs] and press [Enter]. From the menu bar, select [Control | Run Measurement From Capture Buffer | All Frames].

Novell Vital Signs					
Control Config Print Help					
Novell Vital Signs					
	Threshold	Current	Average	Peak	Total
Network Util %	5	0.00	1.07	5.48	
IPX Util %	1	0.00	0.42	5.48	
Network Packets	200	1	52	220	1582
IPX Packets	1000	0	17	220	529
IPX Packet Size	1000	0	64	626	
Local Tx Rate	1000	0	17	220	
Remote Tx Rate	1000	0	0	0	529
Burst Mode	500	0	0	0	0
RIP Frames	10	0	0	2	5
SAP Frames	10	0	0	2	4
Read Rq Pkts	500	0	4	63	142
Write Rq Pkts	500	0	0	0	0
Busy Server %	4	0	0	0	0
Missed Frames	100	0	0	0	0
Start Time: Mar 1 95 @ 11:07:25					
Sample Time: Mar 1 95 @ 11:08:17					
Stopped, Analyzer Data File.					

Novell Vital Signs window

The Novell Vital Signs measurement provides you with an accurate view of Novell frame characteristics, along with network and Novell IPX utilization. Vital Signs display packet statistics as frames enter the capture buffer.

The utilization, packet type, and packet size results track how your network is being utilized. Additionally, the local and remote transmit rate results show you the source of frames on the ring. Do the frames originate on the local ring or on the remote ring? The Internet Advisor's point of reference is that the ring it is attached to is the local ring. The user could relocate the Internet Advisor to another ring to obtain different perspectives.

The burst mode results would indicate if any of the Novell stations are using burst operations to send multitudes of frames in a sequence, as opposed to the usual way of acknowledging frames individually.

Using a filter to focus on a Novell server, you could analyze, the amount of read and write requests being handled over a time period. Additionally, information about busy server frames and percentages could assist the network manager in optimizing or tuning server utilization.

2. From the Novell Vital Signs menu bar, select **[Config | Configure measurement]**.
3. Configure the Network Utilization % Threshold for **[5%]**, set the IPX Utilization % Threshold for **[5%]**, and the Network Packets Threshold to **[150]**. Log threshold events should be checked. From the menu bar, select **[Done | Accept changes and exit]**.

Configure For: Novell Vital Signs	
Done Cancel Defaults Create Run Page Help	
Page 1 of 4	
Log threshold events	<input checked="" type="checkbox"/>
Network Util % Threshold	5
Stop on Threshold	<input type="checkbox"/>
IPX Util % Threshold	5
Stop on Threshold	<input type="checkbox"/>
Network Packets Threshold	150
Stop on Threshold	<input type="checkbox"/>
More >	
Press Enter to enable (checkboxmark) or disable.	

Novell Vital Signs configuration window

4. Press **[F7]** to open the Event Log. From the menu bar, select **[Browse | Browse Threshold Events]**. Position the threshold events browser into the lower left-hand side of the display and then size the window as shown in the example on the next page. Iconize the Event Log by pressing **[F4 | I]**.
5. From the Novell Vital Signs window, select **[Control | Run Measurement From Capture Buffer | All Frames]**, to run the Novell Vital Signs.

Novell Vital Signs						ies [Help]
Control | Config | Print | Help						istics
Novell Vital Signs						Summary Stats
	Threshold	Current	Average	Peak	Total	ation Stats
Network Util %	5	0.00	1.07	5.48		Protocol Stats
IPX Util %	5	0.00	0.42	5.48		Top Talkers
Network Packets	1500	1	52	220	1502	Reporters
IPX Packets	1000	0	17	220	329	Local Signs
IPX Packet Size	1000	0	64	626		Signs
Local Tx Rate	1000	0	17	220		Signs
Remote Tx Rate	1000	0	0	0	529	Signs
Burst Mode	500	0	0	0	0	
RIP Frames	10	0	0	0	0	
SAP Frames	10	0	0	2	5	
Read Rq Pkts	500	0	4	63	142	
Write Rq Pkts	500	0	0	0	0	
Busy Server %	4	0	0	0	0	
Missed Frames	100	0	0	0	0	
Start Time: Mar 1 95 @ 11:07:25						
Sample Time: Mar 1 95 @ 11:08:17						
Stopped, Analyzer Data File.						

Date	Time	Type	Description
U 02/22/95	12:24:06.18	Thrsh	Utilization exceeded the threshold. 5.48%. Fr
U 02/22/95	12:24:06.90	Thrsh	IPX Utilization exceeded the threshold. 5.48 Fr
U 02/22/95	12:24:07.34	Thrsh	Packets exceeded the threshold. 220 fr/s. Fr
U 02/22/95	12:24:08.43	Thrsh	Packets exceeded the threshold. 195 fr/s. Fr
U 02/22/95	12:24:10.25	Thrsh	Packets exceeded the threshold. 176 fr/s. Fr
U 02/22/95	12:24:11.18	Thrsh	Packets exceeded the threshold. 177 fr/s. Fr

Novell Vital Signs and All Events Browser

From our previous example, you started running Novell Vital Signs, and because the Internet Advisor can simultaneously capture data and post results to the Novell Vital Signs window, we chose to stop the Vital Signs measurement and review the data in the capture buffer with the decode to see who is sourcing the data and why. You could also replay this data through the Statistics Top Talkers measurement to review the top 50 active stations when the packets threshold was exceeded.

- Press [F5] to close the Vital Signs window, and press [F5] to close the Thresholds Events Browser. From the Measurements window, Decodes category, select [Novell Stack Decode] and press [Enter].
- From the Novell Stack Detailed Decode menu bar, select [Other displays | Open Summary Decode window]. Press [F4 | Z] to zoom the summary decode window.

Novell Stack Summary Decode				
[Control] [Config] [Actions] [Format] [Other displays] [Print] [Help]				
Frame	Time	Source	Destination	Protocols
28	07:46.162	CLASS SERVER	FFFFFFFFFFFF	Novell RIP IPX 882.
37	07:54.329	ALLEGRO-002	FFFFFFFFFFFF	Novell SAP IPX 882.
38	07:54.330	CLASS SERVER	ALLEGRO-002	Novell SAP IPX 882.
39	07:54.331	ALLEGRO-002	FFFFFFFFFFFF	Novell RIP IPX 882.
40	07:54.332	CLASS SERVER	ALLEGRO-002	Novell RIP IPX 882.
41	07:54.333	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
42	07:54.337	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
43	07:54.337	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
44	07:54.338	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
45	07:54.340	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
46	07:54.341	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
47	07:54.341	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
48	07:54.344	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
49	07:54.345	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
50	07:54.346	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
51	07:54.382	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
52	07:54.383	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
53	07:54.384	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
54	07:54.385	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
55	07:54.386	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
56	07:54.387	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
57	07:54.388	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
58	07:54.390	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token
59	07:54.391	ALLEGRO-002	CLASS SERVER	NCP IPX 882.2 Token
60	07:54.392	CLASS SERVER	ALLEGRO-002	NCP IPX 882.2 Token

Advisor Data File c:\user\class\vtvit.tr, limits 1 - 1502.
At start of buffer.

Novell Stack Summary Decode window

You can see that the Class Server and Allegro-002 are conversing with each other and loading the network.

9. Press [F5] to close the Novell Stack Summary Decode window, and press [F5] to close the Novell Stack Detail Decode window.

Run DECnet Vital Signs

1. The Advisor Data File c:\user\class\decnet.tr must be loaded into the capture buffer.

NOTE: The data contained in the decnet.tr data file was created in a lab environment. Actual DECnet data may be different. This file was created to trigger all the DECnet Commentator events and many DECnet Vital Signs events.

2. From the Measurements window, Statistics pane, select [DECnet Vital Signs] and press [Enter]. From the menu bar, select [Control | Run Measurement From Capture Buffer | All Frames].

DECnet Vital Signs					
Control | Config | Print | Help					
DECnet Vital Signs					
	Threshold	Current	Average	Peak	Total
Network Util %	10	0.00	0.00	5.20	
DRP Util %	5	0.00	0.00	2.60	
LAT Util %	5	0.00	0	0.11	
MOP Util %	5	0	0	0	
LAUC Util %	5	0	0	0	
Network Packets	1200	1	0	253	303
DRP Packet Size	18600	0	4	1465	
DRP Data Msgs	100	0	0	149	184
DRP Control Msgs	10	0	0	10	10
DRP RTS Packets	10	0	0	1	2
DRP Hi. Visit Ct	1	0	0	1	2
NSP Fragments	100	0	0	25	31
NSP Retrans CI	5	0	0	13	13
DECU Util. %	5	0.00	0.00	2.60	
DECU Packet Sz	1500	79	10	553	
CLNP Error PDU	10	0	0	2	2
DECU Data PDU	100	1	0	92	118
DECU Low Lifetime	5	0	0	2	2
TP Error PDU	10	0	0	1	1
DECU Low Credit	5	0	0	3	9
DECU Fragments	100	0	0	22	22
Missed Frames	100	0	0	0	0
Start Time: Jun 22 94 0 8:23:35					
Sample Time: Jun 22 94 0 8:33:53					
Stopped, Analyzer Data File.					

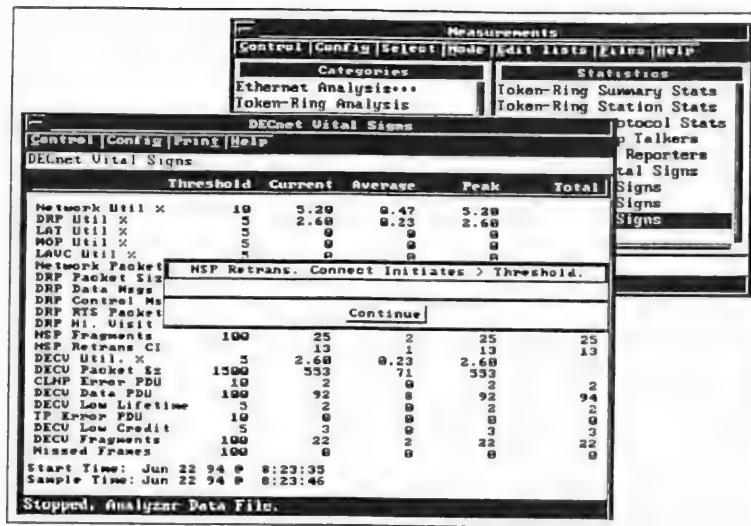
DECnet Vital Signs window

The DECnet Vital Signs measurement provides an accurate view of DECnet frame characteristics, along with network and DECnet utilization. DECnet Vital Signs displays the events that are occurring as they are captured into the capture buffer.

Some particular events to review from the example above are the number of DRP data messages versus the number of DRP control messages. There should be a much higher number of data messages (real user data frames) than control messages (routing and control messages).

Another event to review from the example above is the NSP Retrans CI. These are Retransmitted Connect Initiate frames. If the number is high, it can indicate a problem with your network, your server, or your end user. If the count is high you can troubleshoot further by using the DECnet Commentator measurement, which shows which stations are involved. This is important in troubleshooting this problem. If you notice that many users are sending multiple Connect Initiates to one server, then that server is probably overloaded. If just one user is sending multiple Connect Initiates to one or more servers, then the problem is most likely in the end station. However, if many stations are sending Connect Initiates to several servers, then poor overall network performance is most likely the cause.

- DECnet Vital Signs can be configured to include certain thresholds and to stop all measurements when a threshold is exceeded. From the DECnet Vital Signs window, select [Config | Configure measurement].
- Select [Log threshold events]. Page down to the NSP Retrans CI Threshold, set it for [5], and check the [Stop on Threshold]. From the menu bar, select [Done | Accept changes and exit]. Re-run the DECnet Vital Signs from the capture buffer by selecting [Control | Run Measurement From Capture Buffer | All Frames]. The measurement will stop and display a message that it stopped due to the threshold being exceeded.



All Measurements stopped because NSP Retransmissions exceeded threshold.

5. Press [Enter] to continue. Press [F5] to close the DECnet Vital Signs measurement.

To investigate any DECnet Vital Sign events further, you should run the DECnet Commentator. It provides additional detailed information about any of the DECnet Phase IV or V events.

Help Text for Vital Signs

Vital Signs measurements contain a wealth of information about your network's physical layer activity and how your protocols are operating on the network. Often, it is not possible to remember what every field means. Context-sensitive Help text is provided for your convenience. If you are not sure of the exact meaning of a field in a Vitals Measurement, simply click on the Help Menu Option to review the Help text.

1. From the Measurements window, Statistics category, select [Token-Ring Vital Signs] and press [Enter].
2. From the Token-Ring Vital Signs window menu bar, select [Help].

Token-Ring Vital Signs					
Control | Config | Print | Help					
Token-Ring Vital Signs					
Token-Ring Vital Signs topics					
Menu bar description					
Thru					
About this window					
Using the windows interface					
Using help					
System topics					
Network Counts (Pre-Filter)					
Utilization %					
Frames					
Bad FCS					
Code Violations					
Aborts					
Tokens					
Buffer Counts (Post-Filter)					
Utilization %					
Frames					
Code Violations					
Aborts					
Rcv Congestion					
Burst Errors					
Line Errors					
Soft Errors					
Beacons					
Claim Tokens					
Ring Purges					
Missed Frames					
Start Time:					
Sample Time:					
Stopped, Analyzer Data File.					

Token-Ring Vital Signs Help option.

- From the Help menu bar option, select [Token-Ring Vital Signs topics]. From there, select [Code Violations]. Press [F4 | Z] to zoom the Help text window.

Help: Code Violations

Topics | Previous | Related | Print

Code Violations is a count of violations in the Differential Manchester code. Differential Manchester code is used to convert binary data into signal elements. These signal elements allow the receiver to derive clocking pulses from the encoded signal. Each bit of data consists of two signal elements of opposite polarity. This maintains the DC balance in each bit and guarantees a transition for clocking.

The diagram below shows the Differential Manchester code:

1 0 1 1 0 Non-Data J Non-Data K

Data on the ring is encoded using Differential Manchester Encoding in which a half-bit clock signal is synchronized against a bit slot as follows:

- 0 is represented as a positive OR negative transition at the beginning of a bit slot.

To scroll: f, b, ←, →, PREV or NEXT PAGE. To close: F5.

Context Sensitive Help text - Code Violations.

This context-sensitive Help text can be found in all measurements on the Internet Advisor.

- Press [F5] to close the Help text window and press [F5] to close the Vital Signs window.

Chapter Notes

Chapter Notes

Chapter 7 - Commentators

Objective

Isolating a LAN problem or tuning a network can often mean searching through thousands of captured frames, most of which are insignificant or irrelevant. Commentators will increase your productivity and save you time by automating the processing of this information and helping you determine what is important and what is not.

Think of Commentators as expert troubleshooters for monitoring data traffic, following the protocols, and reducing hundreds of frames to a handful of significant events. Each event is completely described, time-stamped, and rated in terms of its severity. Commentators operate in real time, interpreting data traffic as it occurs.

For a given media, you can run all protocol Commentators simultaneously from the Network Commentator, or you can select them individually. Frame numbers causing the Commentator events are listed so that you can view specific frames to define and resolve the network problems.

In this chapter, you will learn to configure and run Commentators to better manage and troubleshoot your network, and you will also learn how to review individual frames with decodes.

Topics Covered

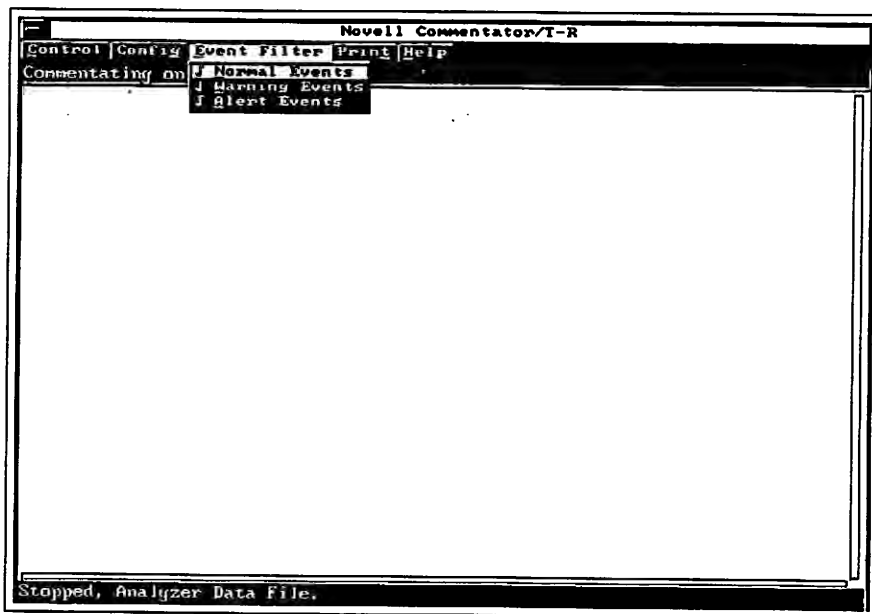
- Novell Commentator -- observe and summarize a Novell client accessing a server
- Token-Ring Commentator -- analyze a station inserting in a ring, and a beaconing ring
- DECnet Commentator -- analyze normal, warning, and alert events
- Help text for Commentators

Preparation

- The Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.
- The Station List `c:\user\class\class.lst` should be loaded.
- The Advisor Data File `c:\user\class\comm.tr` must be loaded into the capture buffer.

Run the Novell Commentator

1. From the Measurements window, Commentators category, select **[Novell Commentator/T-R]** and press **[Enter]**. Press **[F4 | Z]** to zoom the Commentator window.
2. From the menu bar, select **[Config | Configure measurement]**. Select **[Defaults | Restore default values]**. Then select **[Done | Accept changes and exit]**.
3. From the menu bar, select **[Event Filter]**. Ensure each event level is checked. Use the down arrow key to highlight an event, then press **[Enter]** to select that event. The Event Filter is a function of the Commentator, and acts like a display filter. The actual network data is still captured by the Internet Advisor.



Novell Commentator – all events selected in Event Filter

4. From the menu bar, select **[Control | Run Measurement From Capture Buffer | All Frames]**. When the Commentator is finished running, press the **[Home]** key.

```

Novell Commentator/T-R
Control Config Event Filter Print Help
Commentating on: Novell

*** Running from frame 1 to 3565 ***

NOV: General Service Response [Normal] Mar 1010:43:03.2131385
To Node: FFFFFFFFFF
CLASS SERVER ---> 00122892-FFFFFFFF
Name: CLASS SERVER
Network: 00122192 Server Type: File Server
Hops to destination: 1
Frame Number: 3

NOV: Nearest Service Query [Normal] Mar 1010:43:23.4889923
From Node: 00608C21C29D, ALLEGRO-002
00000000-00608C21C29D ---> 00000000-FFFFFFFF
Server Type: File Server
Frame Number: 22

NOV: Nearest Service Response [Normal] Mar 1010:43:23.4820199
To Node: 00608C21C29D, ALLEGRO-002
CLASS SERVER ---> ALLEGRO-002
Name: CLASS SERVER
Network: 00122192 Server Type: File Server
Hops to destination: 1
Frame Number: 23

Stopped. Analyzer Data File.

```

Novell Commentator window

Events Observed using the COMM.TR Advisor Data File:

Nearest Server Query/Response—The Service Advertising Protocol allows stations that provide a service, for example file or print servers, to advertise the service and their address. Workstations can request the name and address of the nearest server of a certain type, and they will receive a response from the server.

Routing Information—Request/Responses used to exchange routing information. The request packet is used by workstations to find the fastest route to a remote station. The response contains a list of network numbers and the hops-away count to that network.

Negotiate Buffer Size—This event shows the transaction between the workstation and file server for negotiating the buffer size to be used in future transactions between the two. Buffer sizes should match, and be as large as possible for a given configuration.

Failed Replies—These events are normal and are viewed by Commentator as the client searches down through the file system on the class server. The amount of failed replies can be reduced by optimizing the file path structure on the server.

Open File LOGIN.EXE—Client requesting to open a file on the server.

Reading File LOGIN.EXE—Client requesting to read a file on the server.

Closed File LOGIN.EXE—Specified file has been closed. The number of file accesses and the time taken (in hours, minutes, seconds, and fractions of seconds) for the file transfer are shown. It also shows the rate of transfer in kbytes a second, and the average data size of the packet.

5. Type [close] to find the first "Closed File" comment. Notice the frame number for the closed file event is frame # 185.

6. The "NOV: Closed File LOGIN.EXE" comment description line should be highlighted. Press [Enter]. The Help text window opens and displays information about a Novell file close. After reviewing the Help text, press [F5] to close the Help text window.

7. Use the down arrow key to highlight the "Frame Number: 185" comment description line and press [Enter]. The Novell Stack Detailed Decode window opens and displays frame number 185. Press [F4 | Z] to zoom the window.

Novell Stack Detailed Decode		
Control | Config | Actions | Forget | Other displays | Print | Help		
Frame: 185 Time: Mar 01@10:43:24.2892894 Length: 59		
Field	Value	Description
NCP:		
Request/Reply Type	3333	Reply
Sequence Number	79	
Connection Number	1	
Task Number	0	
Reserved	00	
Completion Code	00	Successful
Connection Status	00	Good
> Reply to frame number	184	Close File
IPX:		
Checksum	FFFF	
IPX Length	38	
Transport Control	00	
Packet Type	17	NCP
Destination Network	00122892	
Destination Node	00608C21C29D	
Destination Socket	4003	
Source Network	00122192	
Source Node	000009255270	
Source Socket	0451	File Service Packet
> Data size	8	
SAP:		
Destination SAP	E0	IPX
Source SAP	E0	IPX
Advisor Data File c:\User\class\conn.tr, limits 1 - 3565.		

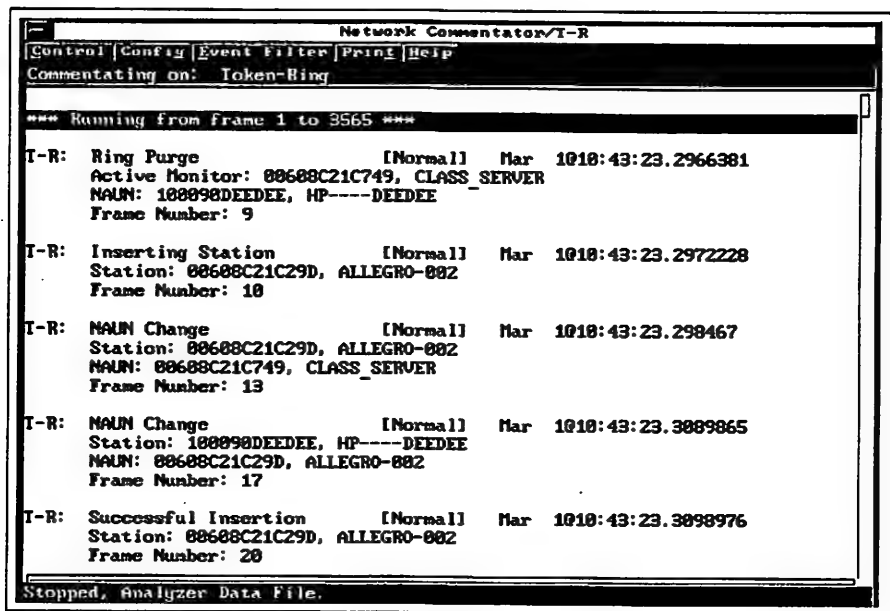
Novell Stack Detail Decode. Successful Novell file close.

8. You can see that Commentator distills the important information from frames in the capture buffer, or on the network. Press [F5] to close the decode window and press [F5] to close the Commentator window.

Run Token-Ring Commentator

This section examines a series of events that transpire as a station inserts into a Token-Ring network.

1. From the Measurements window, Commentators category, select **[Network Commentator/T-R]** and press **[Enter]**. Press **[F4 | Z]** to zoom the Commentator window.
2. From the menu bar, select **[Config | Configure measurement]**. To configure the measurement just to observe Token-Ring MAC events, use the down arrow key to highlight the Token-Ring Events box and press **[Enter]**, until a check mark is in the box. To deselect other protocol events, press the **[PgDn, or Page Down]** key. Highlight the other protocol event boxes (there are 10 configuration pages with other protocol event boxes) and press **[Enter]** to remove the check mark. From the menu bar, select **[Done | Accept changes and exit]**.
3. From the menu bar, select **[Control | Run Measurement From Capture Buffer | All Frames]**. When the Commentator has stopped, press the **[Home]** key.



Commentator displays station inserting information

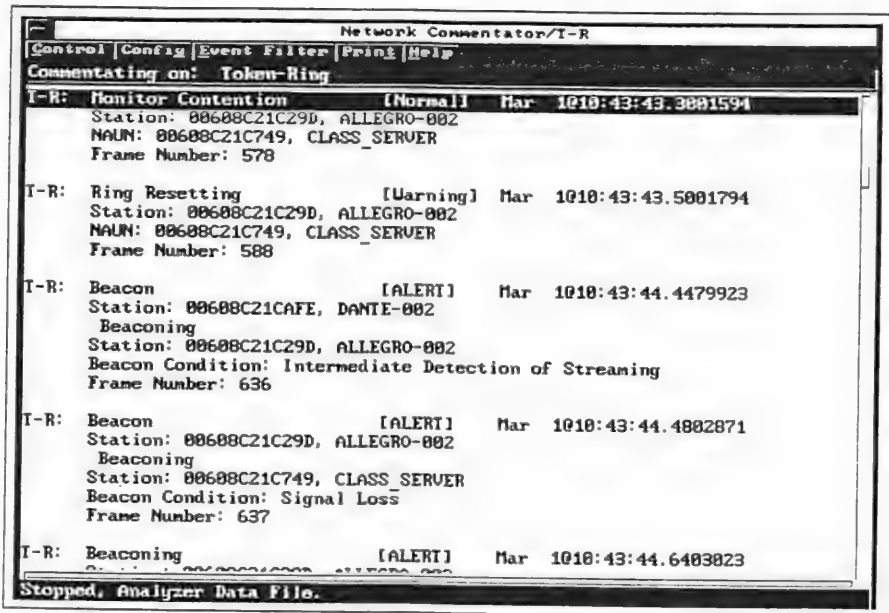
The Sequence of Token-Ring Commentator Events are:

- The Active Monitor observes that a Allegro-002 wishes to enter the Token-Ring so it performs a Ring Purge.
- Allegro-002 attempts to insert into the ring.
- Because the ring order is about to change, two NAUN changes occur. The inserting station is positioned between two other stations at the network MSAU.
- The Commentator displays information about the successful insertion of the station into the Token-Ring network.
- Additionally, you will see several Soft Errors that occur frequently in the network.

Token-Ring Network Fault: The Beaconsing Ring

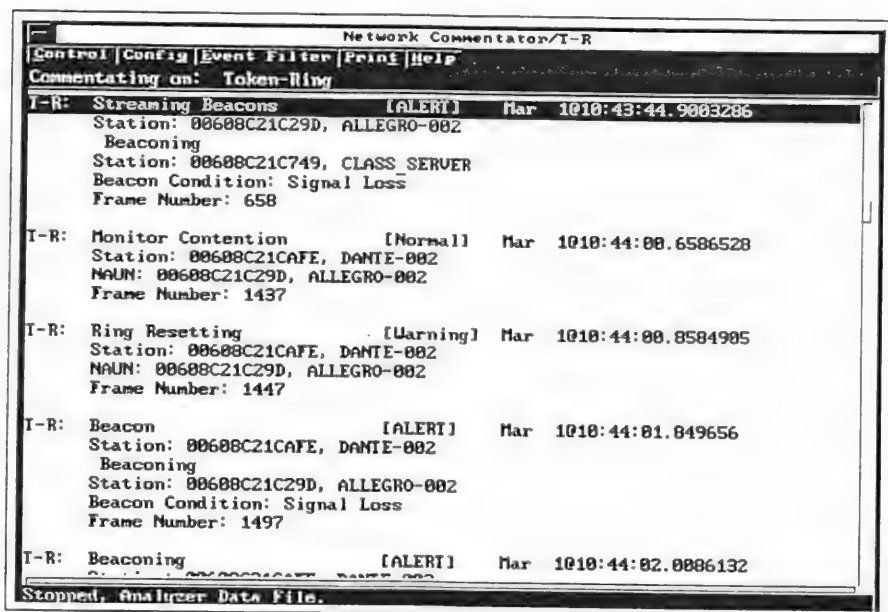
The conditions below start on page 4 of the Token-Ring Commentator. Press the [Home] key, then type [Monitor Contention]. Use the [Shift] and [Down Arrow or Up Arrow] keys simultaneously to align the screen as in the example on the following page.

- The Stations Allegro-002 and Class Server are having problems; Allegro-002 isn't seeing the token coming from the Class Server so Monitor Contention begins.
- Because Monitor Contention exists, the ring must be reset. Commentator views Ring Resetting.
- The Token-Ring fault has escalated into a Beacon condition since the reset didn't clear the fault. There should be numerous Beacon observations since the Class Server will have to obtain 8 of these frames before it removes itself from the ring to execute a Token-Ring lobe test.



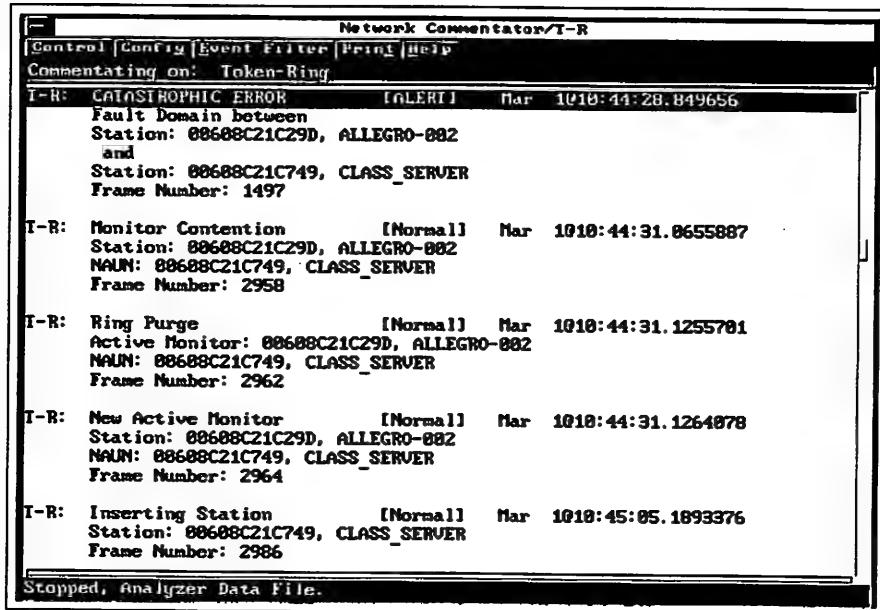
Network Commentator displaying Monitor Contention

- The Beaconing condition escalates into a Streaming Beacon condition after a certain period. The two stations are attempting to locate the faulty Token-Ring NIC card or possibly a wire fault.



Network Commentator displaying Streaming Beacons condition

- Since Allegro-002 “beaconed off” the Class Server, the server had to remove itself from the ring and verify that its Token-Ring lobe test passed. Once it passed it has the right to re-enter the ring. Now it's Allegro-002's turn to remove itself from the ring and check itself out.
- The ring is still in a beacon state, and both stations involved in the process must separately verify that there isn't a fault with their NIC cards or wiring. The standard states that this shouldn't take longer than 26 seconds. After the 26 seconds, the ring escalates itself into a Catastrophic Error state where it requires manual intervention to correct the Token-Ring fault.



Network Commentator displaying Catastrophic Error condition

- Notice that the Commentator, in the Catastrophic Error, displays the actual fault domain. This particular fault could be a stuck MSAU port or a broken TX or RX wire.

Commentator will operate in both **Participate** and **Non-Participate** modes. Refer to chapter 1, Setting Up the HP Internet Advisor for Token-Ring, for detailed information about network operational modes.

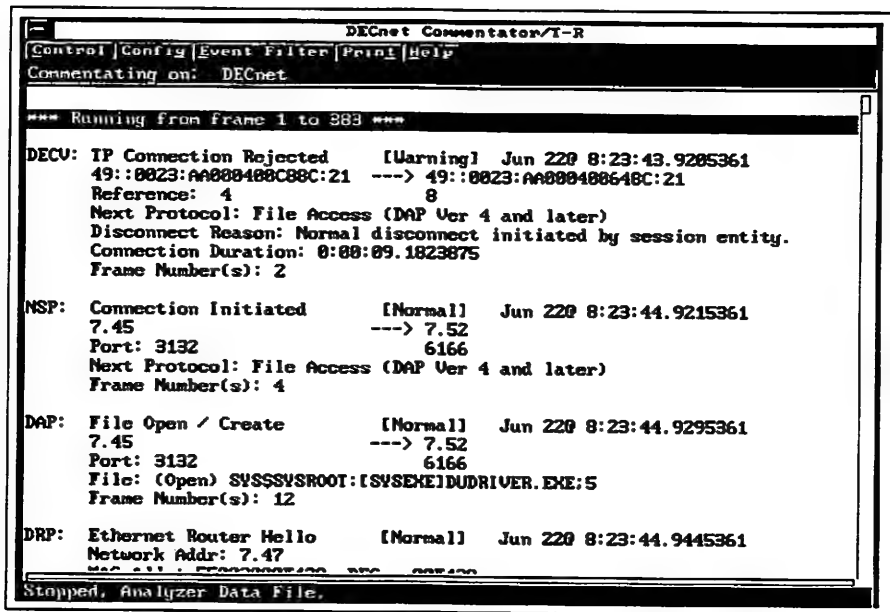
4. Press [F5] to close the Commentator measurement.

DECnet Commentators

Run the DECnet Commentator and review a normal event, a warning event, and an alert event. The Advisor Data File `c:\user\class\decnet.tr` must be loaded into the capture buffer.

Note: The data contained in the decnet.tr data file was created in a lab environment. Actual DECnet data may be different. This file was created to trigger all the DECnet Commentator events.

1. From the Measurements window, Commentators category, select [DECnet Commentator/T-R] and press [Enter].
2. From the menu bar, select [Config | Configure measurement]. Select [Defaults | Restore default values]. From the menu bar, select [Done | Accept changes and exit].
3. From the menu bar, select [Control | Run Measurement From Capture Buffer | All Frames]. After the measurement has run, press [F4 | Z] to zoom the measurement, then press the [Home] key.



DECnet Commentator window

The DECnet Commentator measurement provides a high-level view of significant network events. These events may signal problems that could lead to network performance degradation or network failure. DECnet Commentator lets you identify potential network problems without sifting through pages of decodes. The DECnet Commentator provides detailed information about DECnet Phase IV and V events.

4. First, review a Normal DECnet event--a file close. To quickly find the file close comment, type [file close], notice that the DAP: File Close comment is on your screen.

```

DECnet Commentator/T-R
[Control] [Config] [Event Filter] [Print] [Help]
Commentating on: DECnet

Hello time: 15
Router: 7.45 pri: 64 (known 2 way)
Router: 7.46 pri: 64 (known 2 way)
Frame Number(s): 27

DRP: Router Identified [Normal] Jun 22@ 8:23:44.9445361
      Network Addr: 7.47
      MAC Addr: 55002000F438, DEC---00F438
      Router Type: Level 2
      Frame Number(s): 27

DAP: File Close [Normal] Jun 22@ 8:23:44.9665361
      7.45 ---> 7.52
      Port: 3132 6166
      File: (Open) SYSSYSROOT:[SYSEXE]DUDRIVER.EXE:5
      Bytes r/w : 15982 / 0
      Transfer rates r/w (bytes/sec): 429783 / 0
      File Access Duration: 0:00:00.037
      File Access Completion: Closed
      Frame Number(s): 49

NSP: Connection Initiated [Normal] Jun 22@ 8:23:44.9695361
      7.45 ---> 7.52
      Port: 3130 18260
      Next Protocol: File Access (DAP Ver 4 and later)

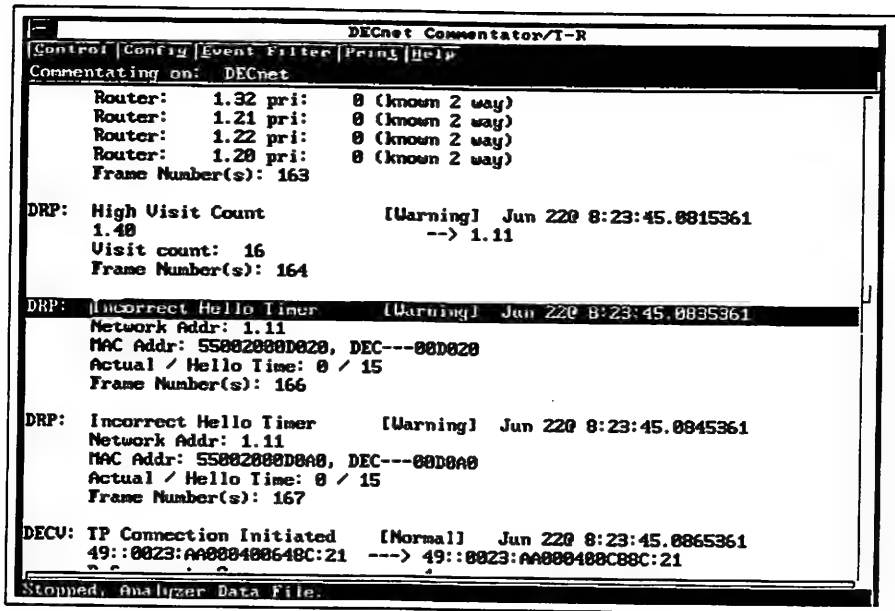
Stopped, Analyzer Data File.

```

DAP: File Close comment

The File Close comment provides information about which stations were involved, which file was closed, and file transfer rates. The frame number is provided for you if you want to look at the data frame in more detail using the DECnet Phase IV/V Stack Decode. For most Commentator events, reviewing the decode is not required. The Commentator provides all details necessary to troubleshoot without using the decodes. However, if you want to review the decode, then use the down arrow key to highlight the "Frame Number(s): 49" comment description line and press [Enter]. The DECnet IV & V Stack Detailed Decode opens and displays frame 49.

5. Next review a Warning event -- a DRP Incorrect Hello Timer. To find this event, press [CTRL] and [E] simultaneously, to erase the last search then, type [incorrect], and the first "incorrect hello timer" comment is displayed. To find additional incorrect hello timer comments, press [CTRL] and [F] simultaneously. To search backward, press [CTRL] and [B] simultaneously.



DAP: Incorrect Hello Timer event

An Incorrect Hello Timer event is triggered if the actual time interval between two Endnode Hello messages is less than or greater than the Hello Timer field in the frame by N seconds. N is specified on the configuration page in the Hello Time Threshold field. Since DECnet is a chatty protocol, you will want to ensure that individual stations are not sending Hello messages too often.

6. Finally, review an Alert event--CLNP Zero Lifetime. To find this event, press [CTRL] and [E] simultaneously, to erase the last search then, type [zero], and the first "zero lifetime" comment is displayed. A zero lifetime frame means that the frame cannot be forwarded to another network segment. Depending upon where you are monitoring the network, this can indicate serious problems. If frames are being dropped because there is a zero lifetime and that frame needed to go to another segment to communicate with the server, then the network performance is not optimum due to requests for retransmissions.


```

DECnet Commentator/T-R
Control/Config/Event Filter/Print/Help
Commentating on: DECnet

DECU: CLNP Low Lifetime      [Warning] Jun 220 8:23:45.0635361
49::0023:AA000400658C:20 ---> 49::0023:AA000400668C:20
Lifetime value: 1.0 secs
Frame Number(s): 146

DECU: CLNP Error PDU        [Warning] Jun 220 8:23:45.0635361
49::0023:AA000400658C:20 ---> 49::0023:AA000400668C:20
Reason code: Reassembly interference.
Frame Number(s): 146

DECU: CLNP Zero Lifetime    [ALERT] Jun 220 8:23:45.0645361
49::0023:AA000400658C:20 ---> 49::0023:AA000400668C:20
Lifetime value: 0.0 secs
Frame Number(s): 147

DECU: CLNP Error PDU        [Warning] Jun 220 8:23:45.0645361
49::0023:AA000400658C:20 ---> 49::0023:AA000400668C:20
Reason code: Reassembly interference.
Frame Number(s): 147

NSP: Connection Initiated   [Normal] Jun 220 8:23:45.0665361
35.102 ---> 35.200
Port: 8364 119
Next Protocol: File Access (DAP Ver 4 and later)

Stopped. Analyzer Data File.

```

DECU: CLNP Zero Lifetime event

7. A closer look at this frame with the DECnet IV & V Stack Decode shows that the field lifetime is set at zero. Use the down arrow key to highlight the "Frame Number(s): 147" comment description line, and press [Enter]. The DECnet IV & V Stack Decode opens and displays frame 147. Press [F4 | Z] to zoom the decode window.

DECnet IV & V Stack Detailed Decode		
Control Config Actions Format Other displays Print Help		
! Frame: 147 Time: Jun 22 8:23:45.8645361 Length: 72		
Field	Value	Description
CLNP:		
Network Protocol Id	10000001	CLNP
Length Indicator	34	Error: Incorrect Length Indicator
Version/Protocol Id	00000001	First edition 1988-12-15
Lifetime	0	Error: Lifetime expired
Segmentation Permitted	0.....	Segmentation not permitted
More Segments	.0.....	No more segments
Error Report	..0.....	
Type	...00001	Error Report PDU
Segment Length	37	
Checksum	00-00	Checksum not used
NET Length Indicator	18	
Authority and Format Id	49	IDI format - Local, DSP syntax - I
Initial Domain Id		
Domain Specific Part		
	00-23-AA-00-04-00-66-8C 20	
NET Length Indicator	18	
Authority and Format Id	49	IDI format - Local, DSP syntax - I
Initial Domain Id		
Domain Specific Part		
	00-23-AA-00-04-00-65-8C 20	
Reason Discard Code	11000001	
Advisor Data File c:\user\jinclass\userdata\decnet.tr, limits 1 - 383.		

DECnet IV & V Stack Detailed Decode with frame 147 displayed

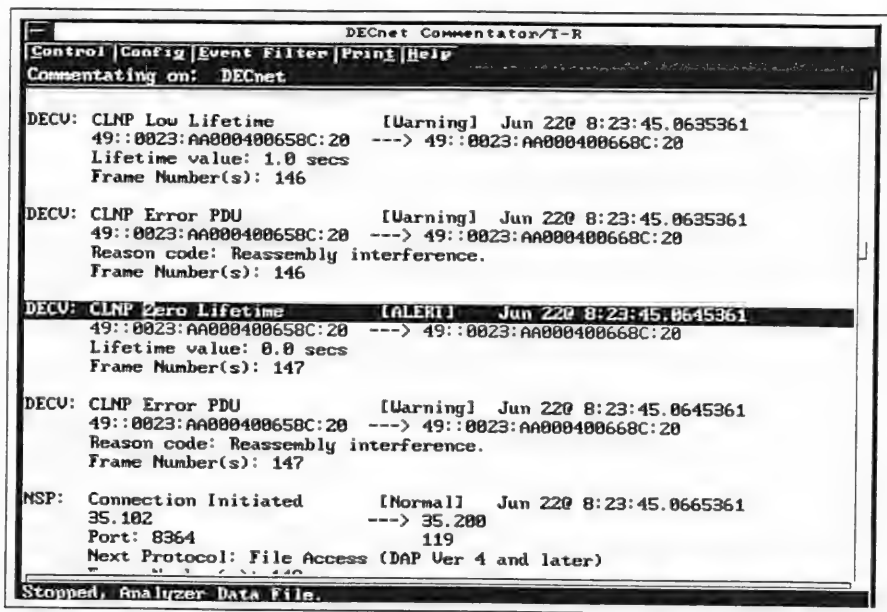
Note the frame is identified (an exclamation mark next to the frame number) as an error. Two errors are reported. One is incorrect length due to our generation of the test frame. The second error is the lifetime expired error.

8. Press [F5] to close the decode window. Do not close the Commentator window.

Help Text for Commentators

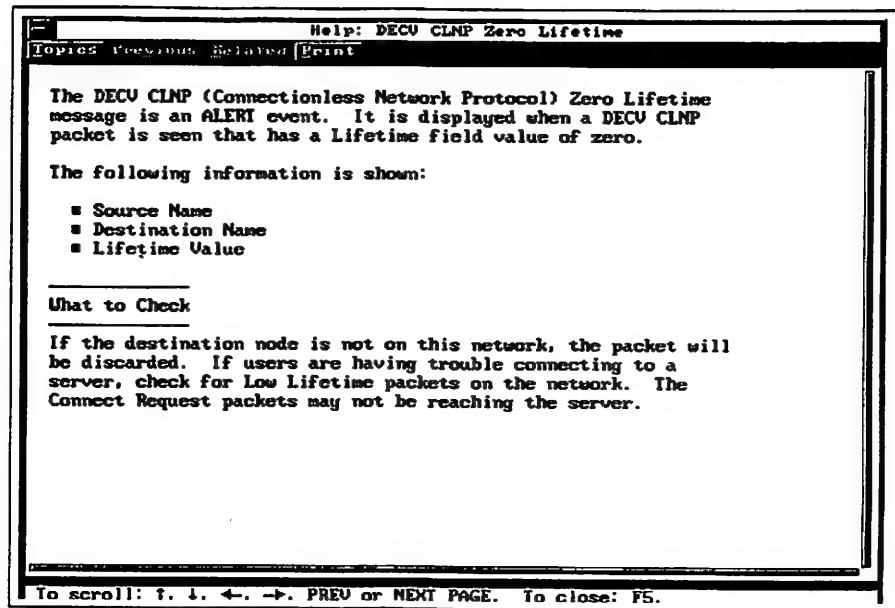
A wealth of information provided in the Commentators. Since it is not always possible to remember exactly what each comment means, context-sensitive Help has been provided within the Commentator measurement.

1. If you need assistance in understanding a comment, from any Commentator's comment description line, press enter and the Help text window appears with a detailed description of that comment. For example: Use your down arrow, or up arrow key to highlight a comment description line, in this case, highlight the "DECV: CLNP Zero Lifetime" comment description line and press [Enter].



DECV: CLNP Zero Lifetime comment description line

The Help text window appears with a detailed description of the CLNP Zero Lifetime comment. Press [F4 | Z] to zoom the Help text window.



Help text for DECV CLNP Zero Lifetime

Detailed Help text can be viewed from the Commentator measurements or any other Internet Advisor for Token-Ring measurement.

4. Close the Help text window by pressing [F5]. Press [F5] to close the Commentator window.

Chapter Notes

Chapter 8 - Traffic Generator

Objective

The traffic generator in the Internet Advisor for Token-Ring allows you to transmit messages (frames) onto the network. By generating traffic then making measurements, you can recreate and analyze network problems that are related to traffic level.

You can test a station or network to determine the limits of network hardware or protocol implementations by either increasing the amount of traffic it handles, or by inducing perturbations on the network. The traffic generator also lets you find the limits of a device or a group of stations for handling congestion or errors.

A maximum of 32 types of messages are available so that you can duplicate nearly any kind of traffic. Frames that were previously captured into the buffer can also be copied into any or all of these 32 messages to duplicate previously captured data, or to aid in creating complex messages.

For stress testing applications, you can specify the traffic load in these ways:

- percent utilization
- frames per second
- inter-frame spacing

You can also create errored frames to evaluate a network's sensitivity to errors.

Topics Covered

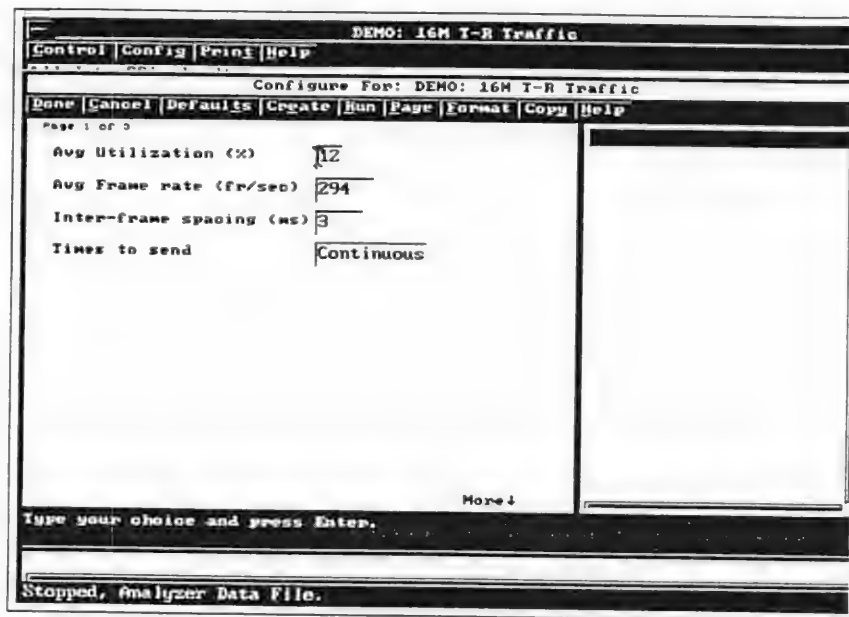
- Examine Traffic Generator functionality
- Create a Traffic Generator measurement
- Delete a Traffic Generator measurement

Preparation

- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.

Examine Traffic Generator Functionality

1. From the Measurements window, Demo Tools category, select **[DEMO: 16M T-R Traffic]**. From the Measurements window menu bar, select **[Control | Open selected measurements]**. Press **[F4 | Z]** to zoom the DEMO: 16M T-R Traffic window.
2. From the DEMO: 16M T-R Traffic window's menu bar, select **[Config | Configure measurement]**.



DEMO: 16M T-R Traffic measurement -- first configuration screen.

Three pages of configuration items can be found in the configuration window.

3. To view the settings on the next page, select **[Page | Next page]** from the menu bar. When another page is available, you'll see "More" at the bottom of the current configuration window.

DEMO: 16M T-R Traffic

Control | Config | Print | Help

Configure For: DEMO: 16M T-R Traffic

Page 2 of 3

More ↑

Activate messages	<input checked="" type="checkbox"/>	
Message #	1	
Message Type	LLC Req Station Test	
Frame length (bytes)	21	
Source address	100090EE1014	
Destination address	100090284000	
FCS type	Good	
FCS value		
Priority	0	
Frame format	LLC	

More ↓

Activate messages

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

Press Enter to enable (checkmark) or disable.
Or press F3, highlight an item, and press Enter.

Stopped, Analyzer Data File.

DEMO: 16M T-R Traffic measurement – second configuration window.

4. To view the settings on the last page, from the menu bar, select [Page | Next page].

DEMO: 16M T-R Traffic

Control | Config | Print | Help

Configure For: DEMO: 16M T-R Traffic

Page 3 of 3

More ↑

Random data field	<input type="checkbox"/>	
Frame bytes 15..22	00-F4-BF-00-00-00-00-00	
Frame bytes 23..30	00-00-00-00-00-00-00-00	
Frame bytes 31..38	00-00-00-00-00-00-00-00	
Frame bytes 39..46	00-00-00-00-00-00-00-00	
Frame bytes 47..54	00-00-00-00-00-00-00-00	
Frame bytes 55..62	00-00-00-00-00-00-00-00	
Frame bytes 63..70	00-00-00-00-00-00-00-00	
Frame bytes 71..78	00-00-00-00-00-00-00-00	
Pad type	User-defined	
Pad value	00	

More ↓

Press Enter to enable (checkmark) or disable.

Stopped, Analyzer Data File.

DEMO: 16M T-R Traffic measurement – third configuration window.

Fields contained in the first two pages of the configuration window are described below:

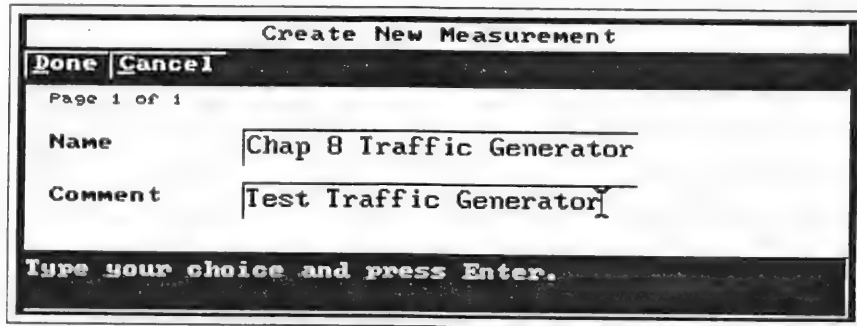
Page 1 Settings	Function
Avg Utilization (%)	Displays the average percentage of the network's capacity that will be used under the current traffic load conditions.
Avg Frame rate (fr/sec)	Lets you specify the average number of frames that will be transmitted per second under the current traffic load conditions.
Inter-frame spacing (ms)	Specifies the amount of time, in milliseconds between frames under the current traffic load conditions.
Times to send	Specifies how many times the Internet Advisor is to send the currently activated frame(s).
Page 2 Settings	Function
Activate messages	Lets you enable the messages you want to transmit when you run the measurement.
Message #	Lets you select any one of the available messages to edit.
Message Type	Lets you choose from a selection of predefined messages or enter a message name of your choice.
Frame length (bytes)	Specifies how many bytes, including the FCS, the frame contains. When modified, the values for Avg Frame rate and Avg Utilization are automatically calculated and updated.
Source address	Specifies the source address of the frame (either a hex value, or a station name in the Internet Advisor's station list).
Destination address	Specifies the destination address of the frame (either a hex value, or a station name in the Internet Advisor's station list).
FCS type	Lets you specify whether the frame will have a good or bad Frame Check Sequence.
FCS value	Indicates the FCS value when the FCS type field is set to have a bad FCS. Otherwise (if the frame will have a good FCS) this field is disabled.
Priority	Lets you specify one of eight priority levels for tokens and frames (0 is the lowest and 7 is the highest). Each token packet has a priority associated with it when it is transmitted around the ring from node to node. Each data packet also has a priority associated with it, based on the type of data to be transmitted.
Frame format	Lets you specify whether the frame is an LLC or MAC frame.

5. Close the DEMO: 16M T-R Traffic measurement without making any permanent changes to it. From the menu bar, select **[Cancel | Cancel changes and exit]**. Close the measurement by pressing **[F5]**.

Create a Traffic Generator Measurement

You can create and save multiple traffic generator measurements, which allows you the flexibility to create custom traffic generator measurements for stress testing networks or components. You don't have to change the configuration every time you want to use the traffic generator for a different purpose.

1. From the Measurements window, Stimulus/Response Tests category, select the **[T-R Traffic Generator]**. From the Measurements window menu bar, select **[Control | Open selected measurements]**.
2. From the T-R Traffic Generator menu bar, select **[Config | Configure measurement]**. From the menu bar, select **[Create | Create new measurement]**. Name the measurement **[Chap 8 Traffic Generator]** and add **[Test Traffic Generator]** to the Comment field. From the menu bar, select **[Done | Accept changes and exit]**.



Create New Measurement

Done Cancel

Page 1 of 1

Name Chap 8 Traffic Generator

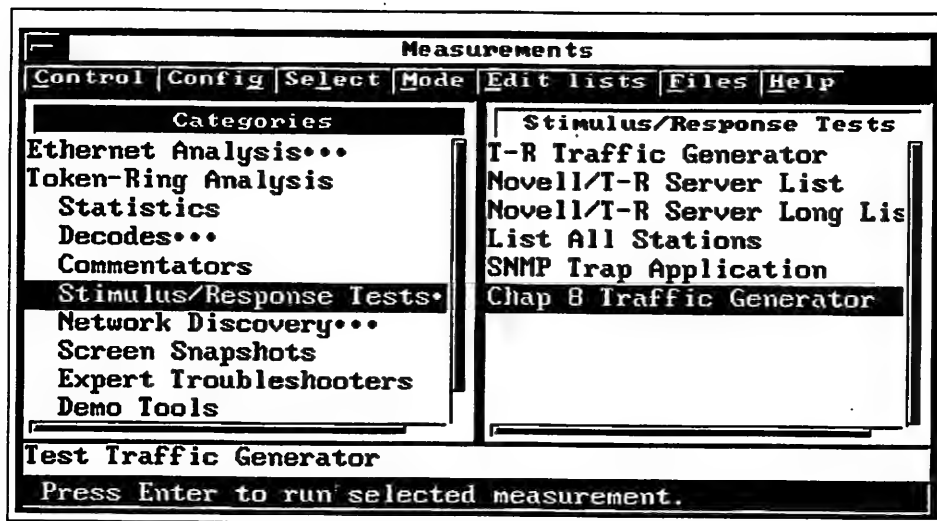
Comment Test Traffic Generator

Type your choice and press Enter.

Creating new traffic generator measurement

3. From the T-R Traffic Generator window, select **[Cancel | Cancel changes and exit]**. This ensures that the original traffic generator measurement does not change. Press **[F5]** to close the T-R Traffic Generator measurement.

The Measurements window shows the new "Chap 8 Traffic Generator" measurement in the Stimulus/Response Tests pane.



New traffic generator measurement available in Stimulus/Response Tests

4. From the Measurements window, Stimulus/Response Tests, select [Chap 8 Traffic Generator]. From the Measurements window menu bar, select [Control | Open selected measurements]. Press [F4 | Z] to zoom the window. From the menu bar, select [Config | Configure measurement].

Chap 8 Traffic Generator

Control | Config | Print | Help

Configure For: Chap 8 Traffic Generator

Done | Cancel | Defaults | Create | Run | Page | Format | Copy | Help

Page 1 of 3

Avg Utilization (%) 2

Avg Frame rate (fr/sec) 459

Inter-frame spacing (ms) 2

Times to send Continuous

More >

Type your choice and press Enter.

Stopped, Analyzer Data File.

Chap 8 Traffic Generator main configuration window

In this configuration window, you can select: Average Utilization percent to send; Average Frame rate (in frames per second); Inter-frame spacing; and the Times to send, either continuous, or a number of times per second.

5. The first 3 fields of this configuration page are interdependent. Change the "Avg Utilization (%)" field to [10%]. Note the change in Avg Frame rate. Change the "Avg Frame rate" field to [3000]. Note the change to Avg Utilization field. Set "Avg Utilization (%)" to [1%], then from the menu bar, select [Page | Next page].

Chap 8 Traffic Generator

Control | Config | Print | Help

Configure For: Chap 8 Traffic Generator

Page 2 of 3

Done | Cancel | Defaults | Create | Run | Page | Format | Copy | Help

More ↑

Activate messages ☒

Message # 1

Message Type LLC Fox Message

Frame length (bytes) 87

Source address 10009021A050

Destination address 100090284000

FCS type Good

FCS value

Priority 0

Frame format LLC

More ↓

Activate messages

1
2
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Press Enter to enable (checkboxmark) or disable.
Or press F3, highlight an item, and press Enter.

Stopped, Analyzer Data File.

Chap 8 Traffic Generator, second configuration window

6. The Activate messages field shows there is only one message activated. You can activate up to 32 messages at a time. Messages are toggled on and off by selecting the message number in the Activate messages pane. The Message Type field is LLC Fox Message. Click on the Message Type field and note the pre-made message types available in the Message Type pane.

Chap 8 Traffic Generator

Control | Config | Print | Help

Configure For: Chap 8 Traffic Generator

Page 2 of 3

Done | Cancel | Defaults | Create | Run | Page | Format | Copy | Help

More ↑

Activate messages ☒

Message # 1

Message Type LLC Fox Message

Frame length (bytes) 87

Source address 10009021A050

Destination address 100090284000

FCS type Good

FCS value

Priority 0

Frame format LLC

More ↓

Message Type

LLC Fox Message
LLC Req Station Test
LLC Req Station MID
MAC Remove Ring Stn
MAC Req Rng Stn Addr
MAC Req Rng Stn Att
MAC Req Rng Stn St

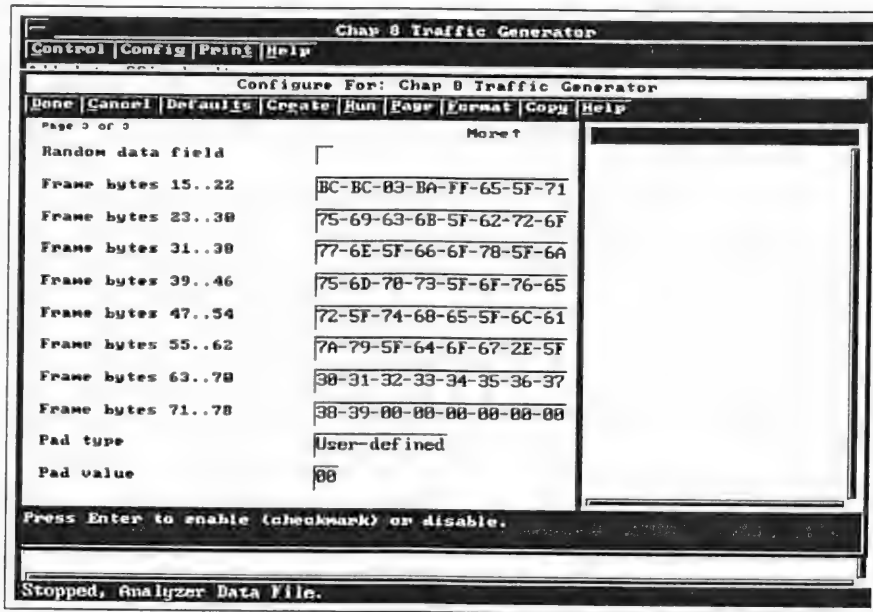
Type your choice and press Enter.
Or press F3, highlight an item, and press Enter.

Stopped, Analyzer Data File.

Multiple message types available

You can use one of these pre-made messages to send, you can create your own message, or you can copy a frame from the capture buffer (traffic generator menu bar, select [Copy | Copy from buffer | Frame #]).

7. The Source and Destination addresses, the FCS value, Frame format, and Priority fields can be modified. Leave message 1, the fox message, activated. From the menu bar, select [Page | Next page].



Chap 8 Traffic Generator, third configuration window

Frame bytes 15 - 78 can be customized. Byte 15 starts immediately after the source address in the Token-Ring frame. For bytes 79 - nnn (configured data length), padding is used (normally all 0s). Notice that the hex values for the fox message are loaded.

8. From the menu bar, select [Done | Accept changes and exit]. Your custom traffic generator measurement is ready to run. **Caution:** You may want to run this measurement with a loopback connector. If you elect to run it on your network, ensure that utilization is set to 1 percent, Times to send is 1, and the fox message is selected.

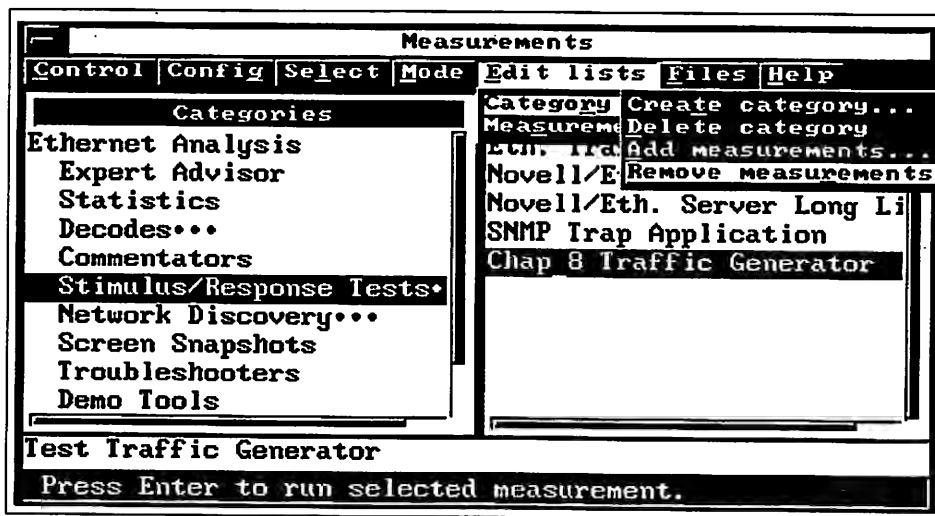
9. From the menu bar, select [Control | Run measurement]. The traffic generator is password protected. If you are prompted for a password, the default set at the factory is "advisor". You can also run other measurements to monitor the impact of the traffic generator on your network. The Advisor is a multi-tasking instrument so you can send traffic and analyze the network simultaneously.

10. From the menu bar, select [Control | Stop measurement]. Press [F5] to close the measurement.

Delete a Traffic Generator Measurement

If you should have to remove a traffic generator measurement from the Stimulus/Response Tests category, follow the numbered instructions below. Also, be sure to remove the Chap 8 Traffic Generator measurement now.

1. From the Measurements window, Stimulus/Response Tests category, select the [Chap 8 Traffic Generator] measurement.
2. From the Measurements window menu bar, select [Edit lists | Measurements | Remove measurement]. A warning message will appear indicating you are deleting a measurement. Check whether you are deleting the proper one, and select [yes] and press [Enter]. Chap 8 Traffic Generator is removed from the Stimulus/Response Test category.



Removing measurement from Measurements window

Chapter Notes

Chapter Notes

Chapter 9 - Stimulus Response Tests

Objective

The Stimulus/Response Tests in the Internet Advisor for Token-Ring contains measurements to actively test Token-Ring, Novell, and TCP/IP stations. This chapter will discuss these tests in detail so you can use them to become more efficient when troubleshooting your network or network stations.

This chapter requires a live network for running the tests. If you don't have access to a live network, review this chapter for information only.

Topics Covered

This chapter includes an overview on the several canned tests, including conceptual views, and when the individual measurement is best utilized. This group of tests is unique in that they transmit frames onto the network and simultaneously receive the results in order to diagnose Token-Ring problems. They include:

- Token-Ring Lobe Test
- List All Stations Test
- Request Station ID Test
- Station Adapter Status Test
- Stimulus/Response Tests overview

Preparation

- Internet Advisor for Token-Ring should not have any measurements running.
- The Measurements window is properly sized and the categories are fully expanded.
- Access to a live network.

Token-Ring Lobe Test

The Token-Ring Lobe Test is executed when the Token-Ring protocol requires that when you are attempting to insert any station into a network, you must first verify that the wiring between the station and the MSAU is operational. Before a station is inserted, the lobe wiring is configured in a local loopback mode where the station's transmit wires are connected to its receive wires.

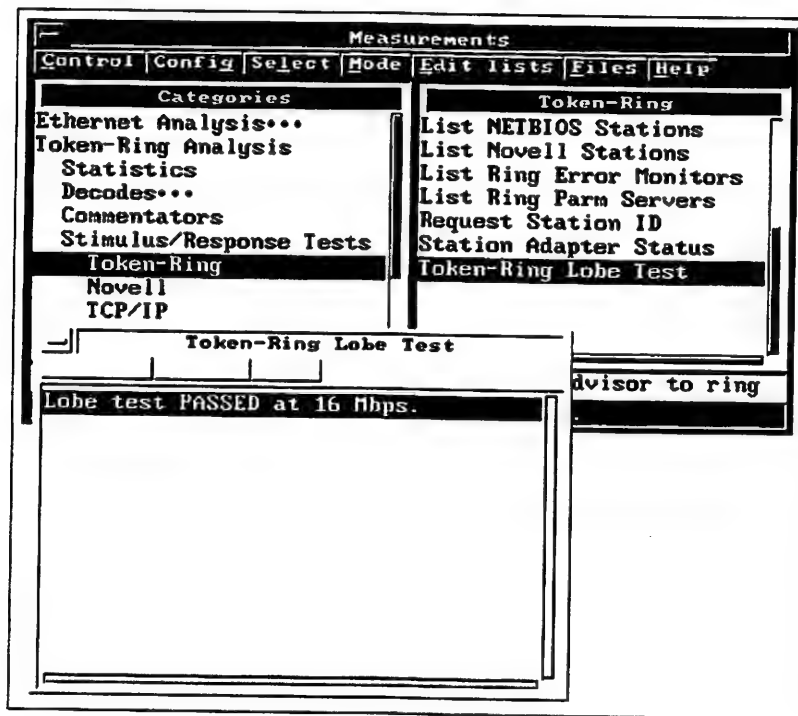
The Internet Advisor performs this test automatically whenever required that it be inserted into the ring. The Token-Ring Lobe Test provides the ability to perform this test manually, allowing the operator to specifically check suspect lobe wiring.

A Successful Insertion message is considered a NORMAL network event. This event identifies that a station on the ring has successfully completed all five phases of the Ring Insertion Process. These five phases are:

Phase	Description
Phase 0: Lobe Test	The station's Lobe Test consists of sending a series of Lobe Test MAC frames on the station's lobe to verify that there is not a fault in the loop. A lobe is the section of cable that attaches a device to a Media Access Unit (MAU), and the Media Access Unit lets the devices access the ring from a central point. If there is no fault, the station continues to Phase 1.
Phase 1: Monitor Check	The station monitors the ring for an Active Monitor Present, Standby Monitor Present, or Ring Purge MAC frame to determine if an Active Monitor is present, and then continues to phase 2 if it recognizes one of these frames. If the station does not see one of these frames before the Attach Timer expires (18 seconds), either the station is the first on the ring or the Active Monitor is not functioning, and the station enters monitor contention. Upon successful completion of monitor contention, the station either fails the Ring Insertion Process or continues to Phase 2.
Phase 2: Duplicate Address Check	The station checks to see if there is another station with the same address on the local ring using the Duplicate Address Test MAC frame. If the Duplicate Address Test MAC frame is recognized by another station, the inserting station removes itself from the ring. If the frames return unrecognized, the station continues to Phase 3.
Phase 3: Participation in Neighbor Notification	The station attempts to participate in the Neighbor Notification Process to establish its Nearest Active Upstream Neighbor's (NAUN) address and identifies itself to its nearest active downstream neighbor. If the station detects beaconing it will remove itself from the ring with an indication of beaconing. Upon successful participation, the station continues to Phase 4.
Phase 4: Request Initialization	The station requests operational parameters from the Ring Parameter Server. After transmitting four Request Initialization MAC frames, the station assumes the Ring Parameter Server is not present and uses default values.

Run the Token-Ring Lobe Test

1. From the Measurements window, Stimulus/Response Tests category, press [Enter] to fully expand the Stimulus/Response Tests category. Select the Token-Ring category, then tab to the list pane and select [Token-Ring Lobe Test] and press [Enter]. It is the last test in the list. Use the down arrow key to toggle through the tests available until you see the Token-Ring Lobe Test.
2. The Token-Ring Lobe Test will automatically run and display the results, either passed or failed.
3. Review the Help text for detailed information about lobe tests. From the Token-Ring Lobe Test menu bar, select [Help | Token-ring lobe test topics | What is a Token-Ring Lobe Test?]. Press [F4 | Z] to zoom the Help text window.



Token-Ring Lobe Test window

4. Press [F5] to close the Help window, and press [F5] to close the Token-Ring Lobe Test window.

List All Stations

The List All stations test provides information about all stations on the local ring. The Internet Advisor sends out a Request Ring Station address frame to the stations with the broadcast functional address C000FFFFFF. Stations should return a frame containing their adapter status. Information returned includes: MAC address, NAUN, physical location, group, functional address and station function.

1. From the Measurements window, Stimulus/Response Test -- Token-Ring category, select [List All Stations] and press [Enter]. Since this test transmits frames onto the network, the Internet Advisor may prompt you for a password. The default password set at the factory is "*advisor*". The password is case sensitive.
2. Press [F4 | Z] to zoom the List All Stations window.
3. Press the [Home] key to position the List All Stations window at the first observed station. Make a note of the MAC address of a couple of stations from the list. This information will be used in upcoming tests.

List All Stations		
Status of the Functional Address requested:		
1	40009564FFFA	0 msec
	Station Name -	40009564FFFA
	NAUN -	0000F608161E
	Physical Location -	00000000
	Group -	00000000
	Functional Address -	00000000
	Station Function -	
2	10009021A31D	0 msec
	Station Name -	HP----21A31D
	NAUN -	40009564FFFA
	Physical Location -	00000000
	Group -	00000000
	Functional Address -	00000000
	Station Function -	
3	0000F608161E	1 msec
	Station Name -	0000F608161E
	NAUN -	10009021A31D
	Physical Location -	00000000
	Group -	00000000
	Functional Address -	00000001
	Station Function -	Active Monitor.

List All Stations window

4. When you are finished, press [F5] to close the List All Stations window.

Request Station ID

The Internet Advisor can be used to test connectivity to other devices on the network, and obtain status information from specific station addresses. The Request Station ID test is a status monitoring tool that is used to test connectivity from the Internet Advisor to a local or remote station. The test can be configured to run once or continuously. The Request Station ID measurement reports:

- address of the station being queried
- time it takes to respond
- whether more than one device responds to the query
- whether the station is on the local or a remote ring

1. From the Measurements window, Stimulus/Response Tests -- Token-Ring category, select **[Request Station ID]**. From the Measurements window menu bar, select **[Control | Open selected measurements]**. Press **[F4 | Z]** to zoom the Request Station ID window.

2. From the Request Station ID menu bar, select **[Config | Configure measurement]**. Enter a MAC address to test. Use the MAC address of a station observed while running the List All Stations test. Timeout should be set to **[1000]** ms, and Number of Packets should be set to **[1]**. From the menu bar, select **[Run | Run]**.

Request Station ID			
MAC Address	Delay	Routing	Station Name / Duplicate
10809021A31D	0 msec	local	HP----21A31D
-- Final Statistics --			
Transmitted Packets = 1		Received Packets = 1	
min/avg/max = 0/0/0			

Request Station ID window

3. When you are finished, press **[F5]** to close the Request Station ID window.

Station Adapter Status

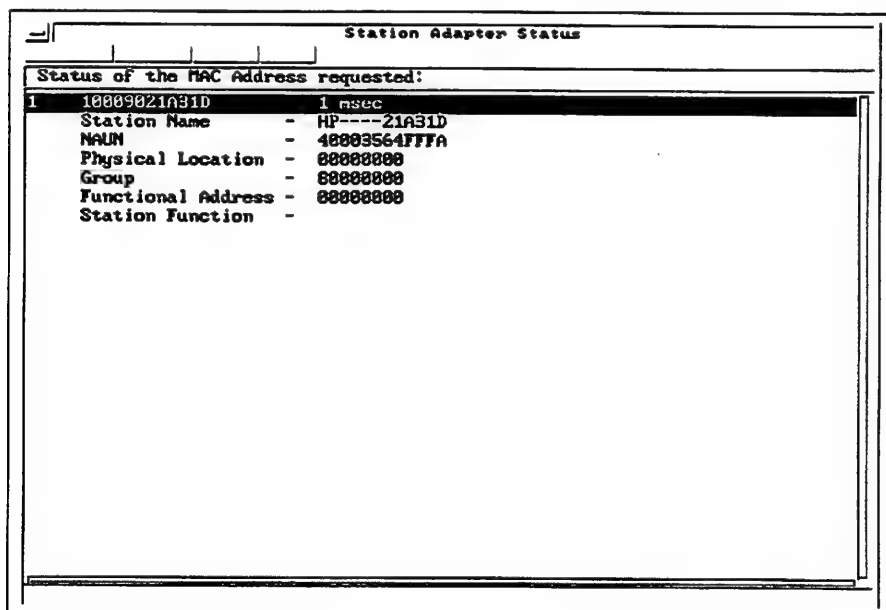
The Station Adapter Status test may be used to obtain status information from the Token-Ring adapter card in any device on the network.

The Station Adapter Status test reports:

- whether the device responds
- the time it took to respond
- that device's Nearest Active Upstream Neighbor (NAUN)
- additional physical, group, and functional information

1. From the Measurements window, Stimulus/Response Tests -- Token-Ring category, select **[Station Adapter Status]**. From the Measurements window menu bar, select **[Control | Open selected measurements]**.

2. From the Station Adapter Status window menu bar, select **[Config | Configure measurement]**. Enter a MAC address to test. Use the MAC address of a station observed with the List All Stations test. Timeout (ms) should be set to **[1000]**. From the menu bar, select **[Run | Run]**.

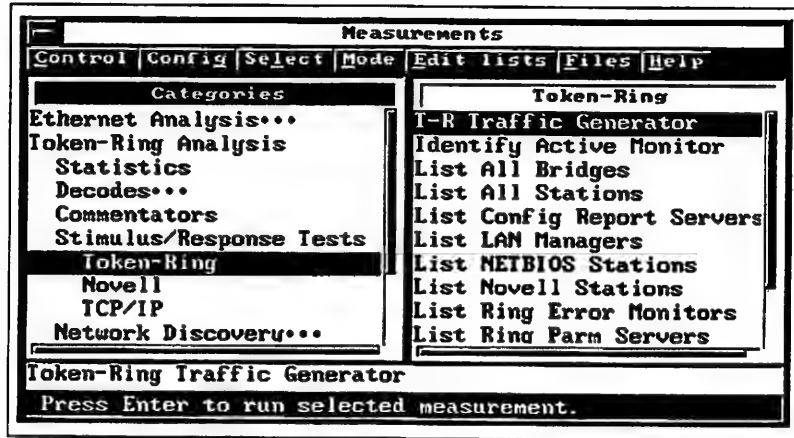


Station Adapter Status window

3. When you are finished, press **[F5]** to close the Station Adapter Status window.

Token-Ring Tests Overview

In the Stimulus/Response Tests category, there are several tests available to help you document and troubleshoot your Token-Ring stations or network. From the Measurements window, Stimulus/Response Tests -- Token-Ring category, review all the tests that are available. Use the down arrow key to toggle through the complete list of Token-Ring tests.

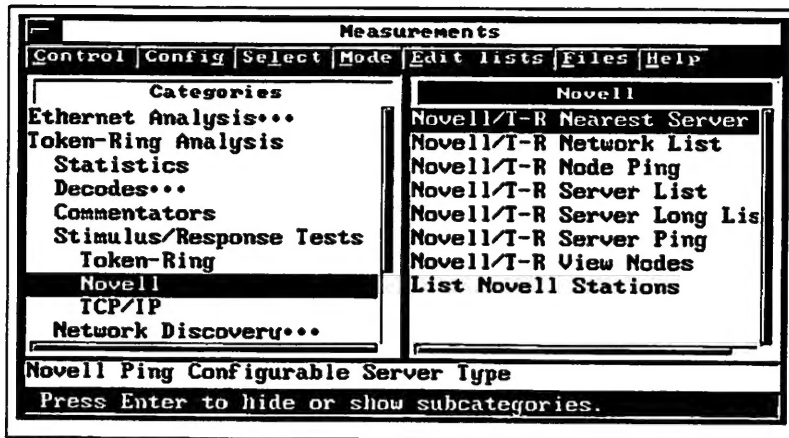


Stimulus/Response Tests -- Token-Ring category

Run each test on your Token-Ring network. Information on each test is available in the Help text. After opening, or starting a test, select [Help] from the menu bar.

Novell Test Overview

In the Stimulus/Response Tests category, there are several tests available to help you document and troubleshoot your Novell stations. From the Measurements window, Stimulus/Response Tests -- Novell category, review all the tests that are available.

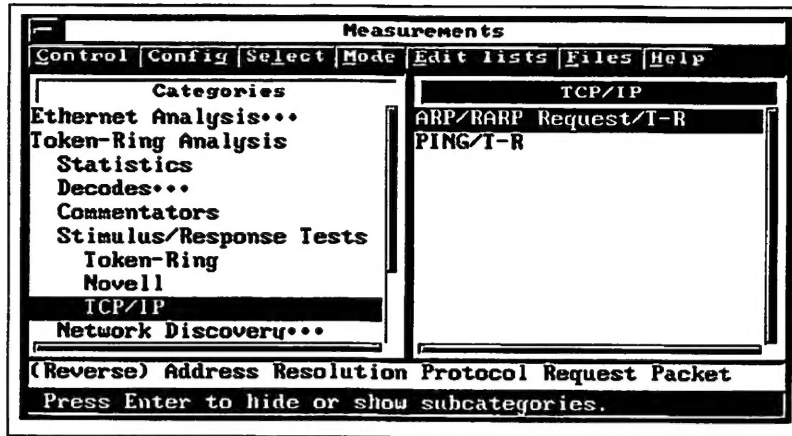


Stimulus/Response Tests - Novell category

Run each test on your Token-Ring network. Information on each test is available in the Help text. After opening, or starting a test, select [Help] from the menu bar.

TCP/IP Tests Overview

In the Stimulus/Response Tests category, there are several tests available to help you document and troubleshoot your TCP/IP stations. From the Measurements window, Stimulus/Response Tests -- TCP/IP category, review all the tests that are available.



Stimulus/Response Tests -- TCP/IP category

Run each test on your Token-Ring network. Information on each test is available in the Help text. After opening, or starting a test, select **[Help]** from the menu bar.

Chapter Notes

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